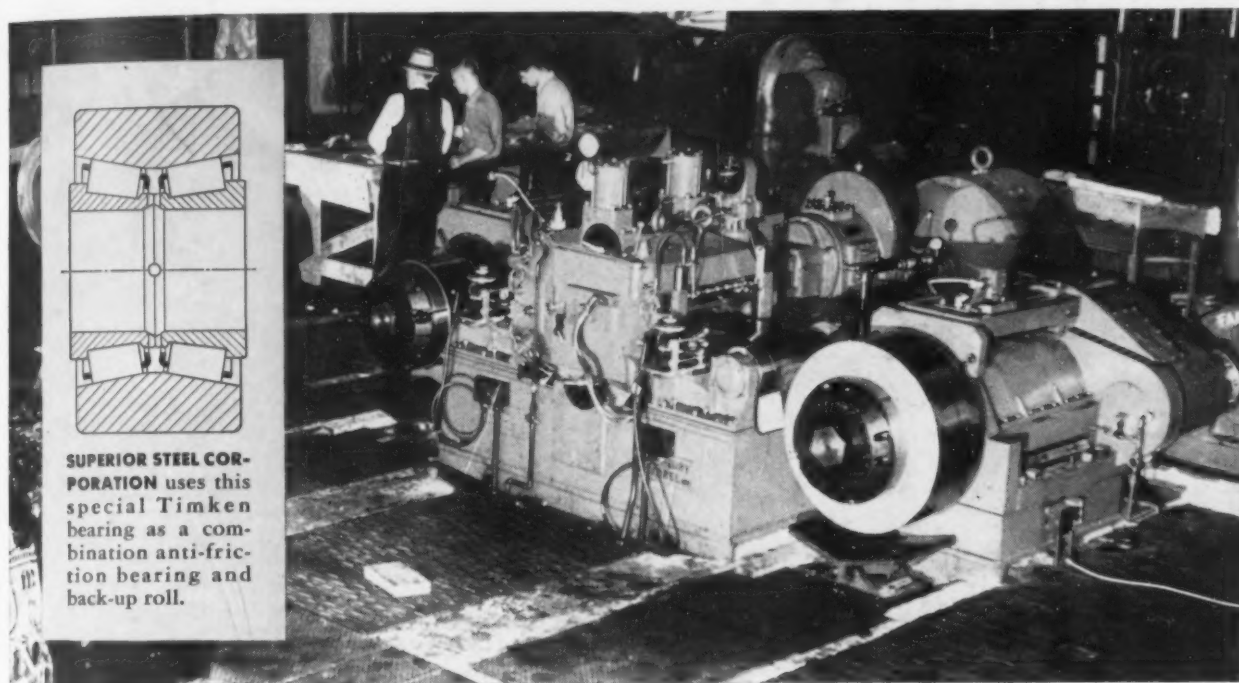


OF MICHIGAN 26 1952 ENGINEERING A CHILTON PUBLICATION Iron Age NATIONAL METALWORKING WEEKLY February 28, 1952

ENTS PAGE 2



SUPERIOR STEEL CORPORATION uses this special Timken bearing as a combination anti-friction bearing and back-up roll.

Less scuffing and scoring in Sendzimer mill with TIMKEN® bearings as back-up rolls

THE Superior Steel Corporation has a total of 54 Timken® tapered roller bearings as back-up rolls in their Sendzimer mill which is used for the cold reduction of high tensile and stainless steels. The Timken bearings used in this application are of a special design in which the outer race of the bearing is the back-up roll.

Timken bearings as back-up rolls reduce end-movement. Thrust washers are unnecessary. Due to the tapered construction of rollers and races, Timken bearings carry both radial and thrust loads in any combination. The O.D. of the outer race has a surface finish of fifteen micro-inches. As a result, scuffing and scoring of the back-up rolls and associated rolls are minimized—and there's less chance of marking the high quality finish stainless steel strip.

The incredibly smooth surface finish and true rolling motion of Timken bearings practically eliminate friction. What's more, Timken bearings provide extra

load-carrying capacity due to line contact between rollers and races.

The extra heavy races of the Timken bearings in this application give maximum support. Since they are the back-up rolls, they simplify design.

No other bearing can give you all the advantages you get with Timken tapered roller bearings. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER □ BEARING TAKES RADIAL ○ AND THRUST —○— LOADS OR ANY COMBINATION —□—

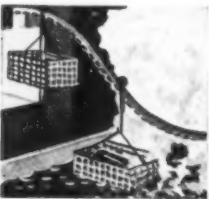
How long will this valve last?



Hoskins Chromel-Alumel thermocouple alloys accurately register exhaust temperatures of jet aircraft engines.



Heating elements made of Hoskins Chromel give long life service in industrial electric furnaces, home appliances.



Hot stuff for hot jobs! Hoskins Alloy 502 is widely used by industry for many heat resistant mechanical applications.

You're looking in on a life-saving operation . . . one that's being performed on an engine valve. Not an ordinary valve for an ordinary engine. But a valve destined for long, hard service in an aircraft, tank, or heavy-duty truck engine. A valve that must be made to stand up under extremely severe operating conditions . . . high temperatures, for long periods of time, plus the destructive corrosive action of hot exhaust gases.

And what's responsible for long valve life under such gruelling conditions? Nothing less than Hoskins Alloy 717 . . . a closely controlled nickel-chromium composition developed especially for just such tough and vital service. It's highly resistant to heat . . . immune to the corrosive atmospheres created by combustion of high octane fuels. What's more, it's readily applied

by fusion to form a non-porous protective facing over the basic valve forging.

But 717 is only one of several specialized nickel-chromium alloys developed and produced by Hoskins. Among the others: Alloy 502 . . . known throughout industry for its dependability on a wide range of heat resistant mechanical applications. The Chromel-Alumel thermocouple alloys . . . unconditionally guaranteed to register true temperature—E.M.F. values within specified close limits. Spark plug electrode alloys which have become universally accepted standards of quality and durability. And, of course, there's Hoskins CHROMEL . . . the *original* nickel-chromium resistance alloy used as heating elements and cold resistors in countless different products.

HOSKINS

MANUFACTURING COMPANY

4445 LAWTON AVENUE, DETROIT 8, MICHIGAN



More Industrial Plants with STEELWORK by BETHLEHEM PACIFIC

GENERAL MOTORS — Sparkling new automobiles for the Western market are rolling from this General Motors Corporation building. It is a recent addition to the Southern California Buick, Oldsmobile, Pontiac assembly plant in South Gate.

The 2700 tons of structural steel for this building were fabricated and erected by Bethlehem Pacific. The contractors and architects were the Argonaut Realty Division of General Motors.



◀ **LEVER BROTHERS** — The new Los Angeles plant of Lever Brothers Company is one of the largest soap-producing plants in the world. It consists of six major buildings, considerable outdoor processing equipment, and a large tank farm, all located on a 30-acre tract.

Besides rolling and fabricating 2000 tons of reinforcing bars, Bethlehem Pacific also fabricated and erected 1200 tons of structural steel for the buildings. Contractors were the Bechtel Corporation. Architects were Welton Becket and Associates. Consulting structural engineer was Paul Jeffers.

AMERICAN CAN — From this building will come an endless stream of containers for the Western packers and refiners. It will provide manufacturing, warehousing, and office space for the American Can Company in Stockton. One story in height, it covers five acres and contains 900 tons of structural steel.

Bethlehem Pacific handled the steel construction. Larsen and Larsen were the general contractors. Donald R. Warren was the architect and engineer.

Bethlehem Pacific Coast Steel Corporation
Fabricating Works: Los Angeles, Alameda,
South San Francisco, Seattle



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IRON AGE

FEBRUARY 28, 1952
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CONTENTS

★ Starred items are digested on opposite page.

EDITORIAL The Control "Complex" 7

NEWS OF INDUSTRY

★Special Report: Steel Wage Stall Hurts Industry.....	55
★Management: Top Executives Get Less Pay	57
★Manufacturing: The Big Boom Has Lulls.....	58
Make Your Own X-Ray Gage.....	59
Production: Plant Tour Conducted by Television.....	60
International: Japanese Plants Want Your Business.....	61
★Controls: Expect More Relaxing	62
Defense Contracts	67
Construction Steel News	70
Industrial Briefs	78
Personnel: Iron Age Salutes	89
Iron Age Introduces	91
Clearing House	160

NEWS ANALYSIS

Newsfront	53
★This Week in Washington	75
★Automotive Assembly Line	80
West Coast Report	85
★Machine Tool Highspots	87

TECHNICAL ARTICLES

★Experimental Furnace Recovers Manganese From Slag	97
New Books	99
★Manufacture and Use of Graphitic Tool Steels Show Vast Progress.....	100
Cupola Hot Metal Increases Steel Production, Cuts Ingot Costs	104
Beneficiation and Conservation Spark AIME Annual Meeting.....	108
Rebuilt Broach Saves \$400 Per Day	111
★Fabricated Ingot Cars Stand Up Under Severe Operating Conditions.....	112

MARKETS & PRICES

★The Iron Age Summary—Steel Outlook	139
Market Briefs	141
Nonferrous Markets	142
Comparison of Prices	144
Iron and Steel Scrap Markets	145
Iron and Steel Scrap Prices	146
Steel Prices	148
Warehouse Prices	151

REGULAR DEPARTMENTS

Dear Editor	9
Fatigue Cracks	11
Conventions and Meetings	13
Free Publications	121
New Equipment	125

INDEX OF ADVERTISERS 172

THE IRON AGE

DIGEST

of the week in metalworking

STEEL SETTLEMENT STALL HURTS INDUSTRY

PAGE 55 Each day without a settlement of the steel industry's wage dispute puts it deeper into a financial hole. Retroactivity is working against the producers. The union says any settlement must be retroactive to Jan. 1—expiration date of most contracts. And a wage hike is practically certain.

EXECUTIVES TAKE DEEPEST SALARY BITE

PAGE 57 While it's not yet necessary to pass the hat around for the unfortunate big executives of industry, top management has 59 pct less purchasing power today than in 1939. Higher taxes and a sheer rise in the cost of living has done the deed. A survey shows how all employee groups fared.

THE BIG BUSINESS BOOM HAS SOFT SPOTS

PAGE 58 Predictions of consumer goods shortages may eventually come true—but when? They haven't made a showing yet and retail shelves are still groaning under a full weight of goods. Demand is staying put while the real boom is in capital goods and heavy industry. Banks still pile up savings.

HAS CONTROLS FRONT BEEN BREACHED?

PAGE 62 Pressures for decontrol on some items are on the upswing. U. S. officials are still skeptical of plentiful supplies—especially of copper and aluminum—but more talk is being heard of relaxation of controls. NPA now recognizes that the market for some types of steel has been softening.

WILL UNION SHOP BE FORCED ON STEEL?

PAGE 75 Industry members of the Wage Stabilization Board will fight the union shop issue. The closed shop struggle is getting hot again as Presidential fact finders urged that it be forced on railroads. Meanwhile the Steelworkers Union is repeating demands that steel sign union shop agreements.

DETROIT MATERIALS CRISIS LOSES ZIP

PAGE 80 The period of materials shortages for Detroit automotive industry has passed—at least temporarily. But copper and aluminum remain stubbornly tight. A big problem today is trying to use materials on hand. Steel sheets, strip and even alloy bars are easier. Pressure for decontrol gains.

TOOL BUILDERS LEERY OF STOCKPILE PLAN

PAGE 87 The government's plan to stockpile new machine tools has builders worried for several reasons. The industry's association may soon go on record on the subject. What the field fears most is government domination through great spending. Stockpiling involves direct purchasing by Washington.

RECOVERY OF MANGANESE FROM O-H SLAG

PAGE 97 From slag containing 2.5 to 11.5 pct manganese, about 6 out of each 10 lb of this critical steel ingredient was recovered in an experimental furnace. Resulting metal is iron-manganese mixture suitable for ferromanganese production. Iron recovered offsets much of the process cost.

GRAPHITIC TOOL STEELS EASIER TO MACHINE

PAGE 100 Tool steels are notoriously difficult to machine. But the machinability of graphite tool steels containing about 0.40 pct free graphite is much superior to that of standard tool steels. Best machinability of these steels is in the spheroidized condition at a hardness of 197 to 229 Bhn.

WELDED INGOT CARS WITHSTAND ROUGH USE

PAGE 112 Ingot cars are subject to extremely rough conditions. These weldments undergo repeated cycles from as low as 0°F up to 2000°F in normal use. At the elevated temperature they are subjected to severe impact loads. Design and fabrication requires special consideration for these conditions.

THREE BIG IFS HOLD STEEL MARKET KEY

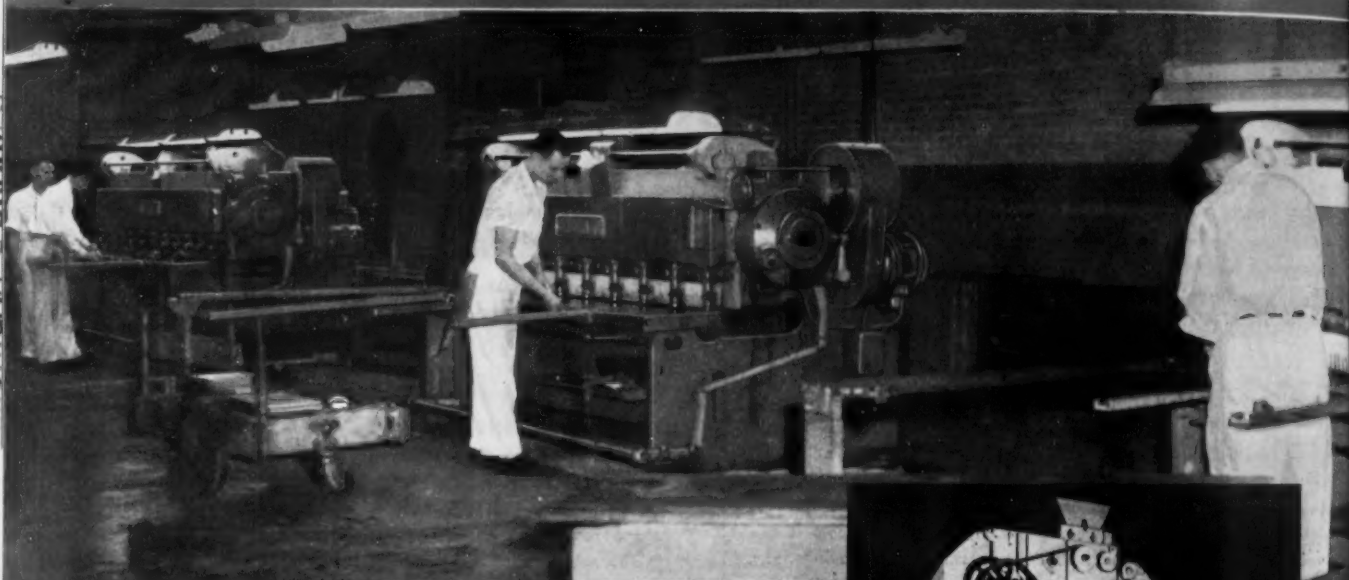
PAGE 139 Do signs of softness forecast a real thaw in the steel market? Three factors hold the market key: Will there be a strike? Will government ease controls to permit more civilian goods? Would makers of consumer durables really have the market they claim they'd have without controls?

SPECIAL ISSUE—TOOLS & TOOL ENGINEERING

NEXT WEEK The 26-page technical section of this special issue will feature articles of special interest to the tool engineer. Subjects covered include carbide salvage, machine tool rebuilding, industrial diamonds, high-speed machining, new tool steels, and tool repair with induction heating.

3 CINCINNATIS

**...shear 750,000 lbs.
of steel every 22 days**



THIS productive and dependable battery of Cincinnati Shears at the John E. Mitchell Company is shearing with accuracy in the manufacture of extracting, cleaning and drying equipment.

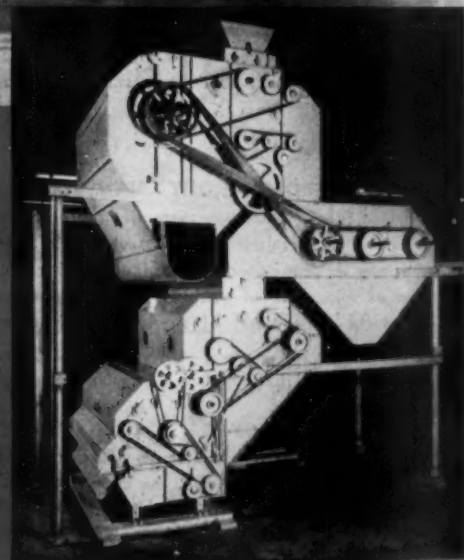
Freedom from shut downs, long knife wear, efficient, accurate gauging and general ease of control all contribute to this steady production.

C-1010 steel in 20, 16, 12 and 7 gauges is being handled.

A 6-foot, 8-foot and a 10-foot Cincinnati Shear make up the battery.

Cincinnati All-Steel Shears are economical producers, and their accuracy also reduces assembly costs.

Write for latest Shear Catalog—S-6—on the complete line of Cincinnati All-Steel Shears.



A John E. Mitchell Company combination machine used in cotton gins. Photos courtesy of the John E. Mitchell Company.

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The Control "Complex"

THERE are several kinds of people who are helping to make this country control crazy. Here are a few case histories:

Mr. I. M. Bigfront had quite a childhood. He was told what to do and what not to do. His mother kept pretty strict control over him. The apron string was loose enough to make him think that he was on his own, but tight enough to get the dependence she craved.

Now Mr. Bigfront is president of the ABC Co., makers of round squares. He is not sure he can make the grade in this economy. Not because he hasn't the ability, mind you, but because he doesn't trust the other fellow. He wants controls. He has replaced his mother's silver cord with government controls.

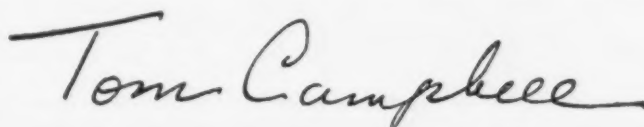
Mr. Henry I-Should-Have-Had-The-Job was behind the other fellows who graduated from school with him. He was behind in happiness and in material things. He wanted both. Things over which he had no control made him a perennial griper: he had to protect his self-esteem.

Henry had a good head and a way with figures and arguments. He landed in government controls service. Without knowing it he had substituted his failure to obtain the things he thought he wanted for a new personality assuager. By controlling things and people he built himself up to a point where he could face himself in the mirror.

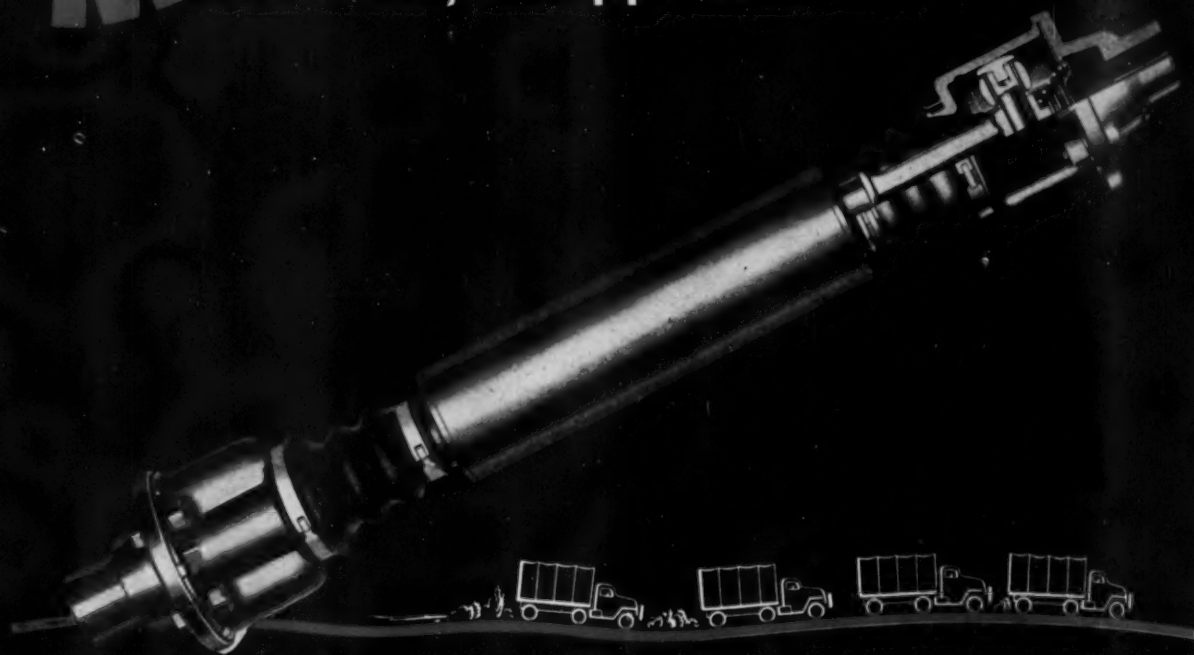
Young Get-Ahead Jones is doing very well. In a sellers' market he has gone up the ladder, joined the right clubs and said the right thing. He is on his way.

Jones knows the ropes, he knows the right people in Washington and he works fast. He is valuable. But since 1940, except for a brief period, he and his friends have been under some kind of government control. Now he is well conditioned to fight for, agree to or become part of "liberal" or "intelligent" controls.

When the control "complex" is more firmly imbedded in our top offices, in our plants and in our homes we will no longer take chances or use our imagination. We will have become a bunch of high class morons—in action if not in I.Q. rating.


Editor

Modern day whippetree . . .



HARNESSING HORSEPOWER TODAY CALLS FOR HIGH STRENGTH **SHARON*** STEELS

Back before the automotive age it required a good, stout whippetree to transfer a single horsepower to the wheels of a carriage. Today we "harness up" 150 horsepower — transferring this energy through a single, slim drive shaft.

This requires good steel. Steel that will withstand a fibre stress of more than 38,000 psi, while spinning at speeds up to 5,000 rpm. Steel with a uniform flat-

ness that will enable fabricators to easily produce a shaft of balanced wall thickness. Steel cold worked to a 95 maximum, with a minimum Rockwell of 80B, and a permissible elongation of but 7 per cent.

Sharon has long been a prime supplier of steels for drive shafts, because making precision steel in production quantities has, over the years, become a Sharon-steel habit.

***Specialists in STAINLESS, ALLOY, COLD ROLLED and COATED Strip Steels.**

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For information on Titanium Developments contact Mallory-Sharon Titanium Corp., Niles, Ohio

SHARONSTEEL

Dear Editor:

Letters from readers

Steel Labor Follies

Sir:
I've just finished reading your editorial "Steel Labor Follies: Act II" of Feb. 14. I agreed with it 100 per. . .

W. N. UMSTATTD
President

Timken Roller Bearing Co.
Canton, Ohio

Thank You

Sir:
It is stimulating to follow your work in THE IRON AGE: how completely and correctly you can absorb the terminology of each of the very diverse fields you cover, exactly as though you had been working in them for years. You surely have raised the general level of the technical papers in your journal.

H. BRUTCHER

Altadena, Calif.

Resolutions and Predictions

Sir:
Several people at our plant have commented on the excellent editorial, "Resolutions and Predictions," appearing in your issue of Jan. 3 and it has been suggested that we get copies of it or try to reproduce it ourselves.

Please indicate if reprints of it have been made which are available for general distribution or give us your permission to reprint it if this is in line with your normal procedure.

L. J. SCHMIDT

Greenlee Bros. & Co.
Rockford, Ill.

Permission granted for reproduction.—Ed.

Heat Transfer

Sir:
Please refer to p. 195 of the Feb. 7 issue of your magazine.

The article entitled "Heat Transfer" deals with a Mr. Braun and Mr. Knudsen telling the American Institute of Chemical Engineers their results on certain heat transfer tests. Can you please give us additional information such as the date and the location of the institute's meeting at which this was presented?

We should also like to know if this talk is now an AICE paper and whether or not reprints can be obtained.

H. F. BRINEN
Research Engineer

Young Radiator Co.
Racine, Wis.

The meeting was held Dec. 2 through 5 in Atlantic City, N. J. The complete name of the paper is "Pressure Drop In Annuli Containing Transverse Fin Tubes." For further information write to the American Institute of Chemical Engineers, 120 E. 41st

St., New York 17, N. Y. You can secure from them a complete transcript of the Heat Transfer Symposium for \$2.50.—Ed.

Can You Help?

Sir:
Will you please send information on a disinfective or antiseptic spray that would be suitable to spray into shot blast hoods to protect the various operators using them.

Our efforts to date have uncovered washes, soaps, detergents, but any liquid applied to the head portion of a shot blast hood becomes a messy operation.

I know there is an antibiotic agent or some drug to kill air born bacteria in a gas carrier such as an aerosol bomb that could be sprayed with no muss and no fuss and nonotoxic to the operator.

J. B. KENNY

Clark Equipment Co.
Buchanan, Mich.

Perhaps one of our readers can help on this one.—Ed.

Disposal of Tools

Sir:
In a recent issue of THE IRON AGE we believe you carried an article or notice that the U. S. Air Force has about 2000 machine tools remaining in storage in Marietta, Ga., that are now for sale.

Will you kindly advise the proper official to contact regarding a list of the machines and method of disposal of these tools.

F. M. ROOS

Purchasing Agent
Consolidated Car-Heating Co., Inc.
Albany

In order to secure any of these tools you must have a government contract and you must work through the contracting officer. You cannot submit a general request to find out what is available, but must request specific equipment and explain your need for it.—Ed.

Beneficiation

Sir:
I was very interested in the article on p. 37 of your Nov. 29, 1951 issue referring to the new plant of the Cleveland-Cliffs Iron Co. and Ford Motor Co. for the flotation of non-magnetic hematite jasper ore to be located in the Marquette Range.

I would like to know whether you have published any further descriptions.

R. SEWELL

United Steel Companies Ltd.
Rotherham, England

This subject was more fully described in the article "Ore: Humboldt Process Step By Step" appearing on p. 115 of our Dec. 6, 1951 issue.—Ed.



A. I. S. I.

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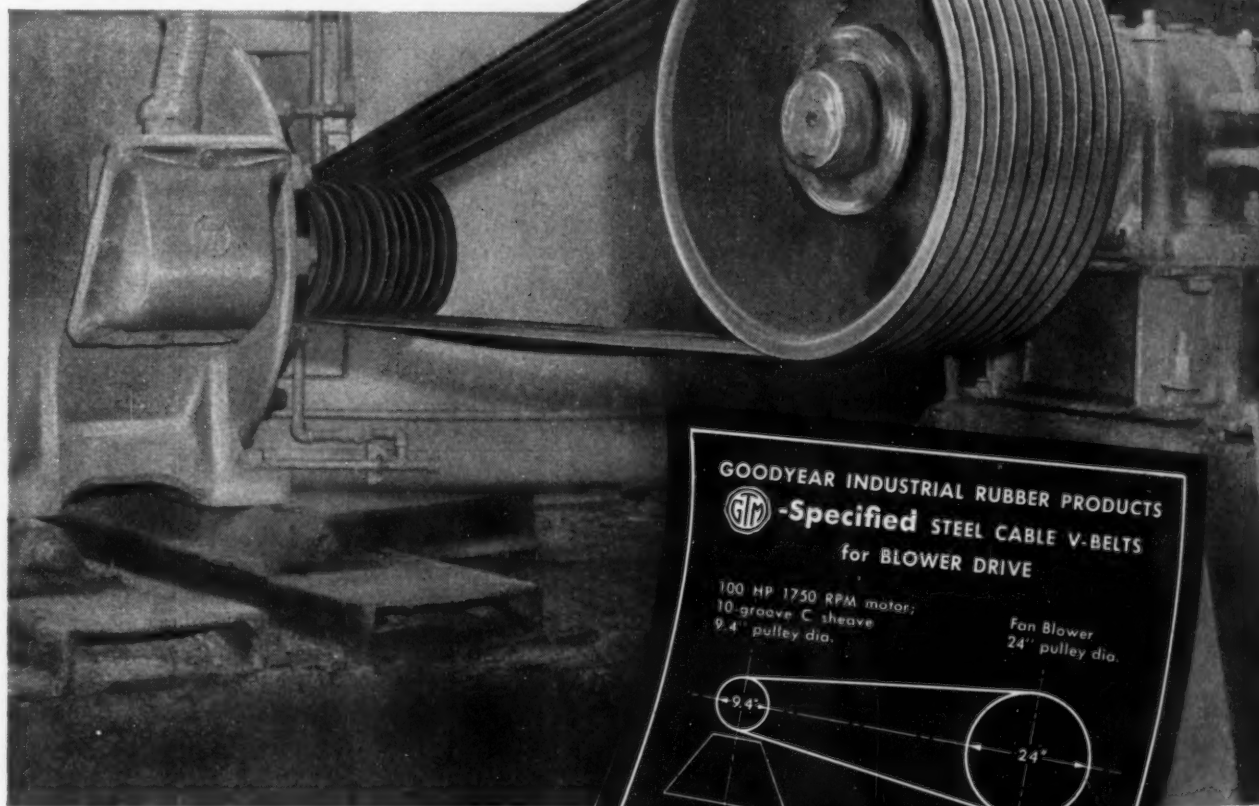
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FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor. Look for him in the yellow pages of your telephone directory.

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

THE IRON AGE Newsfront

► If demand for some steel products keeps dropping, some companies will find academic the question of how much of an increase may come out of the steel wage-price affair. These are the companies whose prices are now well above those of their major competitors.

But with a \$4 to \$5 a ton steel price increase now being rumored in Washington, steel mills with the lowest prices may feel the breath will be squeezed out of them. So the possibility of a strike lies right here because big companies feel they need more than \$4 or \$5 a ton.

► Defense cutbacks strengthen belief that overall easing in steel will come during the second half of this year, though a few products will remain relatively tight.

With new capacity coming in faster than Washington thought possible, mills with open space on their books are jittery. They fear Washington will wait too long to decontrol and their lead time will be lost.

► In the motor car industry steel buyers are now more worried— for the first time since the war—about using up steel on hand than they are about getting more. The shortage period for many automotive steel items has passed, though this does not generally apply to carbon and alloy bars and wide sheets.

► Within the past month at least a thousand cars have been put on the road with some radiator parts made of copper-clad aluminum. These tests will be watched carefully in the hope of finding a solution to a problem that has stumped the auto experts. One previous application apparently involved too much forming, which work-hardened the aluminum. When efforts were made to soften it by annealing the copper-aluminum bond broke down.

► An electric resistance upset forging machine, hydraulically operated, has been proved capable of upsetting up to fifty (50) times the diameter of a shaft.

► Not all the reports about the number of years' supply of items in the hands of the armed forces are as bad as they sound. A 5-year supply of gaskets looks bad—but a 6-month supply of gaskets in each of 20 depots changes the picture.

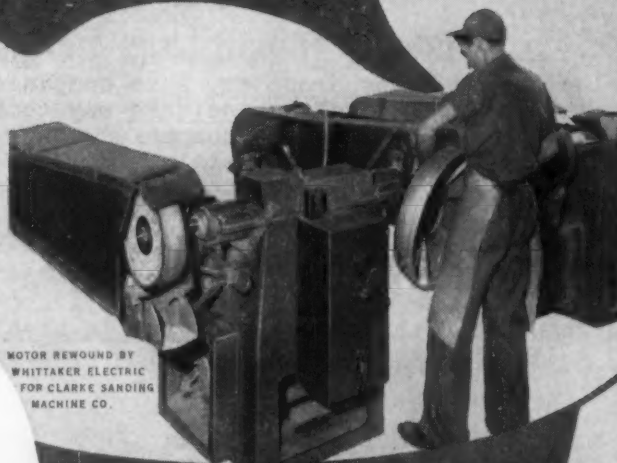
► The Air Force has applied the traveling exhibit technique to procurement in Europe. More than 350 items which might be made in Europe were inspected by 2500 visitors from West Germany, France, Belgium and Denmark during the first 2 days of a recent show in Frankfurt.

► More diamond wheels for grinding tools and parts will be needed in 1952 and 1953 than were used during World War II peak years—but the necessary diamond imports will be down a third. Unless special conservation efforts are started soon the problem could be serious.

► A carbide salvage program in a big electrical manufacturing plant has eliminated 78 pct of the direct loss of this material. This percentage of worn and broken tools is reused.

► Germany's state secretary for foreign trade is encouraging a German steel export group to avoid lively competition for export markets. This is based on information from a European source which puts German steel exports at over 8 million net tons last year, against less than 2 million tons in 1950. But U. S. purchases will be down very sharply this year.

more muscles for motors



MOTOR REWOUND BY
WHITTAKER ELECTRIC
FOR CLARKE SANDING
MACHINE CO.

Overloads, cutting out the breaker on the 5 hp Class "A" motor powering this grinder, caused 25% daily down-time. Motor was rewound with Silicone insulation; 15 hp breaker installed and grinder has been running steadily since.

Production speed-up limited life of Class B crane motors to about 20 days. In two years, \$370 invested in rewinding motors with Silicone (Class H) insulation, saved \$80,000 worth of productive labor, plus rewinding cost, plus value of lost production. (Factual details on request).



E

LECTRICAL Engineers and Production Men can save thousands of dollars* by using Dow Corning Silicone (Class H) Insulation to up-rate standard frame motors of all sizes. Class H Insulation permits higher operating temperatures and heavy overloads for sustained periods, at the same time multiplying motor life—reliability—overload capacity—moisture resistance—and productivity.

Furthermore, at name plate rating, there is no appreciable difference in power factor and efficiency between a Silicone insulated and a Class "A" insulated motor.

If speeded up production schedules are one of your problems, why not add more muscle to your motors by changing over to Class "H" insulated equipment? Most of the leading rewind shops now offer Class "H" Insulation made with Dow Corning Silicones. Talk to the people who rebuild your motors — or call our nearest branch office. There's a specialist in Silicone Insulation there to help you.

*WANT PROOF? Write for Dow Corning Data Sheet O-14

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Washington, D.C.

In Canada: Fiberglas Canada Ltd., Toronto
In England: Midland Silicones Ltd., London

STEEL: Settlement Stall Hurts Industry

Holds short end of contract . . . Union insists on retroactive settlement to Jan. 1 . . . Steel gets deeper into hole . . . What issues could force industry to risk strike—By J. B. Delaney.

The steel industry is already on the short end in its contract dispute with the United Steelworkers of America (CIO). Each day without a settlement puts the industry deeper into the hole.

A little matter of retroactivity is working against the producers.

The union insists that any settlement "shall be fully retroactive" to the expiration date of existing agreements, which, with few exceptions, is last Jan. 1. It made this a condition of its decision last Jan. 4 to forego a strike in the absence of a new contract pending outcome of recently-concluded hearings before a special panel of the Wage Stabilization Board.

The union is not likely to waive this position since it was dictated by a special international convention at Atlantic City.

It is a foregone conclusion that WSB will recommend a wage increase for the steel workers. Regardless of the amount, the steel companies will suffer since higher prices could not be retroactive.

What Union Wants—Betting in the industry is that WSB will make a recommendation acceptable to the union. No one expects the steel workers will get everything they ask—not even the union. The USW will complain about the recommendation but will accept it.

The question of continued operations in the industry will then be up to the producers. And there are several issues that could prompt the producers to reject the recommendation and risk a strike.

These issues include: (1) Price

relief, (2) union shop, and (3) guaranteed annual wage.

On prices the industry is united on the position that it must have relief sufficient to offset cost of new contract terms. And at the moment it appears that Washing-



Phil Murray . . . He grabbed the headlines.

ton is in no mood to go along with this stand. "Leaks" from the capital center around \$3 per ton. This will not be enough.

There is a division of opinion in the industry on the union shop. The larger producers oppose it strongly—on principle. They particularly dislike the idea of a government-dictated union shop. A recent WSB recommendation of a union shop in a railroad dispute gives the industry no grounds for optimism on this score.

But industry members will put up an unrelenting struggle within the Wage Stabilization Board

when it gets around to making recommendations for or against the union shop. (See p. 75.) If union and public factions of the WSB forget that the American worker should have the inalienable right to choose whether he will or won't join a union, then industry members will be outvoted.

Annual Wage—The producers are more hopeful on the guaranteed annual wage. They feel they have convinced the panel the industry is not ready for such a drastic development. At least not in the form proposed by the union.

Industry leaders feel they presented a good case before the panel. They lost the headlines to Philip Murray, USW president, but believe their testimony, though voluminous, was good enough to make an impression. They are far less discouraged than they were in 1949 after arguing their case against pensions, which they lost.

The steel wage dispute is slated to move a step closer to final settlement this week with transfer of major issues from the industry-labor-public study panel to the Wage Stabilization Board.

Nathan P. Feinsinger, WSB chairman, says he expects the 18½¢ per hr demand of the United Steel Workers (CIO) to be one of the first issues WSB will consider.

Other issues will be handled "as separate chunks," as Feinsinger puts it, as they are relayed from the panel to the board. He predicts speedier actions to result from the piecemeal handling.

WSB's final recommendations will be held up until all of the issues have been studied, Feinsinger says.

WSB is "prepared to take up the report promptly and to proceed to formulate its recommendations

Labor

with the maximum speed consistent with the discharge of its other duties," the chairman states.

The union last week set a new strike deadline of Mar. 24 to permit consideration of the WSB recommendation, expected in about 2 weeks. But Mr. Murray emphasized that this would be the final postponement of the strike.

Satisfies Taft-Hartley—Furthermore Mr. Murray said he believed the union through its second strike postponement has satisfied provisions of the Taft-Hartley Act for an 80-day cooling-off period before a walkout. At expiration of the new deadline the union will have held off for 83 days dating from Jan. 1 when most agreements expired.

Thus the government would not be justified in seeking an injunction against a strike.

Some industry industrial rela-

tions executives said the President could still declare a national emergency and obtain an injunction if a strike occurs or is threatened on Mar. 24. When the time comes there probably will be a hot battle on this issue. Other industry observers believe that Mr. Murray's position is tenable.

While Mr. Murray is invested with authority to call a strike, he probably will meet again with his 170-man Wage Policy Committee before doing so. He also indicated possibility of another extension should that be necessary to reduce WSB recommendations to a workable formula.

At last week's meeting the Wage Policy group reiterated the union's position that any settlement terms must be retroactive to Jan. 1.

WSB hearings in the dispute between the union and aluminum producers will open in Washington Mar. 3.

Productivity Held to '50 Levels

Productivity in most manufacturing plants remained on the same level as 1950 in spite of the psychological effect Korean hostilities might have had on labor incentive.

Manufacturing companies surveyed by the National Industrial Conference Board reported that employees have been working at a peak level but that this has been offset by deterrents such as labor inexperience, shifts to defense products, and material shortages.

While cooperation by the labor force and unions toward increasing productivity is generally considered good, labor appears not to differentiate between defense and civilian work.

The survey shows that productivity varied from rises as high as 38 pct above the level of June, 1950, to declines of as much as 12 pct. The influx of inexperienced help, material restrictions, and starts and stops in production because of design changes were responsible for most declines.

Distress Employment Areas Named

U. S. Department of Labor has certified 23 geographic areas as eligible to receive government contracts because of excessive unemployment.

The areas certified are:

Major areas (areas with at least one central city with a population of 50,000 or more)—New York; Detroit, Providence; Wilkes-Barre-Hazleton, Pa.; Grand Rapids and Flint, Mich.; Altoona, Pa.; Brockton and Lowell, Mass.; Atlantic City, N. J.; Asheville, N. C.; Manchester, N. H.; Terre Haute, Ind.; and Laredo, Tex.

Smaller areas: Pottsville, Pa.; Herrin-Murphysboro-West Frankfort, Ill. (formerly classified as Crab Orchard, Ill.); Uniontown-CConnellsville, Pa.; Cumberland, Md.; and Vincennes, Ind.

Labor Department says all of the areas certified have 6 pct unemployment, or anticipate such an unemployment level within the next 2 to 4 months.

STEEL: Finished Shipments Down in December

As Reported to the American Iron & Steel Institute

STEEL PRODUCTS	CURRENT MONTH				Pct of Total Shipments	TO DATE THIS YEAR				Pct of Total Shipments
	Carbon	Alloy	Stainless	Total		Carbon	Alloy	Stainless	Total	
Ingot	99,205	22,990	2,053	124,248	1.9	1,049,827	246,696	19,321	1,315,844	1.7
Blooms, slabs, billets, tube rounds, sheet bars, etc.	137,255	49,675	1,641	188,571	2.9	*1,645,483	575,897	18,367	*2,239,747	2.8
Skelp	11,510			11,510	0.2	152,474			152,474	0.2
Wire rods	60,824	1,140	456	62,420	1.0	826,267	16,121	4,981	847,369	1.1
Structurals	405,825	3,201	1	409,027	6.4	*4,858,678	63,219	73	*4,921,970	6.2
Steel piling	32,073			32,073	0.5	399,073			399,073	0.5
Plates	674,957	31,075	2,002	708,034	11.0	7,499,321	393,219	18,054	7,910,594	10.0
Rails—standard	137,537			137,537	2.1	1,698,880	182		1,699,062	2.2
Rails—all other	8,059	2		8,061	0.1	120,662	53		120,715	0.2
Joint bars	10,177			10,177	0.2	132,173			132,173	0.2
Tie plates	36,255			36,255	0.6	445,932			445,932	0.6
Track spikes	10,736			10,736	0.2	158,406			158,406	0.2
Wheels	29,336	8		29,344	0.4	396,383	178		396,561	0.5
Axles	15,953	109		16,062	0.2	220,402	695		221,097	0.3
Bars—hot rolled	553,475	190,872	3,663	748,010	11.7	*6,803,655	2,284,040	42,938	*8,930,633	11.3
Bars—reinforcing	162,167			162,167	2.5	1,900,125			1,900,125	2.4
Bars—cold finished	129,693	25,956	3,794	159,443	2.5	1,556,740	337,351	41,732	1,935,823	2.5
Tool steel	3,013	10,766		13,779	0.2	33,658	137,398		171,056	0.2
Standard pipe	237,078	68	3	237,149	3.7	2,931,831	1,421	69	2,933,321	3.7
Oil country goods	155,525	15,311		170,836	2.7	1,885,809	193,407		1,879,216	2.4
Line pipe	257,685	34		257,719	4.0	3,185,944	894		3,186,838	4.0
Mech. tubing	53,222	23,367	516	77,105	1.2	674,891	298,896	6,279	980,066	1.2
Pressure tubing	28,997	4,031	919	33,947	0.5	295,243	27,009	10,178	332,430	0.4
Wire—drawn	242,509	4,457	2,506	249,472	3.9	3,136,657	51,699	31,473	3,219,829	4.1
Wire—nails, staples	68,034			68,034	1.1	864,803		30	864,833	1.1
Wire—barbed, twisted	21,979			21,979	0.3	237,803		1	237,805	0.3
Wire—woven fence	29,897			29,897	0.5	416,704			416,704	0.5
Wire—bale ties	9,082			9,082	0.1	110,407			110,407	0.1
Black plate	112,840			112,840	1.8	1,076,296			1,076,296	1.4
Tin &terne plate—hot dipped	110,719			110,719	1.7	*1,628,562			*1,628,562	2.1
Tin plate—electrolytic	240,955			240,955	3.8	*2,887,129			*2,887,129	3.7
Sheets—hot rolled	564,887	19,888	2,833	587,708	9.2	7,837,486	294,662	38,586	8,170,733	10.3
Sheets—cold rolled	745,675	6,843	11,382	764,100	11.9	9,421,051	111,646	106,063	9,640,960	12.2
Sheets—galvanized	145,071			145,071	2.3	1,964,054	907		1,964,961	2.5
Sheets—other coated	20,436			20,436	0.3	257,195			257,195	0.3
Sheets—enameling	17,524			17,524	0.3	182,187			182,187	0.2
Electrical sheets, strip	7,356	47,893		55,249	0.9	134,524	823,337		757,861	1.0
Strip—hot rolled	176,394	2,768	821	179,983	2.8	2,160,726	38,176	8,076	2,206,978	2.8
Strip—cold rolled	138,438	2,305	12,998	153,742	2.4	1,866,055	28,658	191,290	2,076,003	2.6
TOTAL	5,902,754	462,763	45,588	6,411,105	100.0	72,663,497	5,725,943	539,510	*78,928,950	100.0

During 1950 the companies included above represented 99.0 pct of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.

SALARIES: Top Men Get Deepest Bite

Purchasing power of top executives is 59 pct under 1939 . . . Their \$59,000 average salary is worth \$18,000 by '39 standards . . . White collar and hourly workers hold their own.

No, it's not yet necessary to set up a charitable fund for poor top executives—but in terms of purchasing power the leaders of industry are making 59 pct less today than in the golden days of 1939.

Layer after layer of new and higher taxes hand in hand with the sheer rise in the cost of living during that 11-year period have more than offset the scanty 35 pct increase in actual dollars earned, in salary, claims Arch Patton of McKinsey & Co., management consultants.

Result of Survey—This information is based on a survey of 41 large companies in a dozen important industries. The top management level was defined as the highest paid, averaging about \$59,300 per year in 1950, and constituting one-tenth of 1 pct of employees. Other working classes fared better in holding the line against encroach-

ments of a free-spending, tax-ridden economy.

Middle management, the next highest paid group, comprising nine-tenths of 1 pct of hired people, showed a 45 pct jump in gross income over '39—but this was a purchasing power skid of 40 pct.

Salary Trend

	Avg. Pay 1950	Pct Increase 1950 over 1939
Top management	\$59,300	35 pct
Middle management	15,200	45
Supervisory employees	5,500	83
Non-exempt employees	3,400	106

In 1950 this group averaged earnings of \$15,200 per year.

The larger foreman (supervisory) group gained 83 pct in gross salary—but lost 13 pct in purchasing power while earning \$5500 in 1950. White collar and hourly employees received pay rises since 1939 averaging 106 pct. They

were able to do a little better than hold their own against high prices and taxes, registering a 3 pct increase in purchasing power over 1939. Since income of the latter group did not consider overtime, its gain was probably higher.

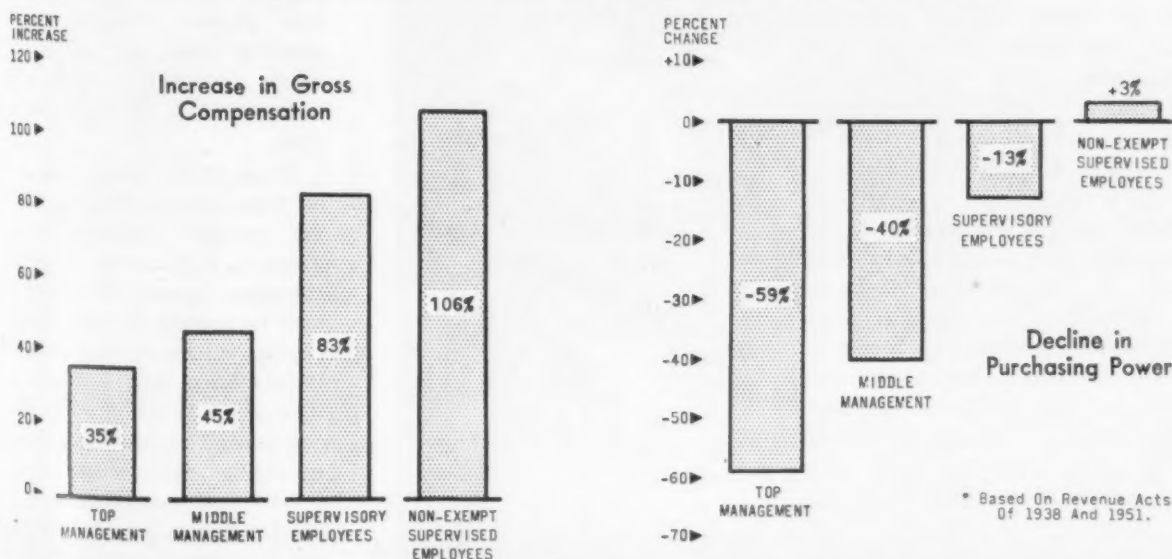
How Steel Fared—In the McKinsey survey roundup were three large steel companies. On the basis of their reports it was determined that top and middle executive compensation in 1950 was slightly under that of the rest of the 41 companies. Yet the sharpest increases were made by these two steel industry categories since 1939, especially among top men.

Salaries and increases of supervisory and white collar and hourly workers in the three steel industries surveyed held to the general industry level.

Top management's average salary of \$59,300 per annum in 1950 is a shadow of itself in 1939 when the assault of higher taxes and rising cost of living is considered, Mr. Patton reports. Its purchasing power is equivalent to only \$18,000 in 1939 terms.

Perhaps top management has not had to hock its Cadillacs but it hasn't been buying many yachts.

Compensation vs. Purchasing Power: 1939-1950



BUSINESS: The Big Boom Has Lulls

Retail shelves still groaning . . . Demand stays put . . . Big boom's in capital goods, heavy industry . . . What's happening to inventory, hardware, and purchasing—By W. V. Packard.

The experts who have been predicting consumer goods shortages ever since Korea will probably be right eventually—but who can say when? More than a year and a half later retail shelves are groaning under their load of goods. And manufacturers in many lines are having a hard time selling to inventory-conscious customers. Still faced with a wide choice of merchandise, consumers are in no hurry to part with their cash.

Thus, we find a number of business vacuums in the middle of the big boom. So far the boom is largely in capital goods. Many consumer goods industries are dragging their feet, a fact which can not be blamed entirely on controls shackles.

Postwar expansion in some basic lines (steel for example) was largely aimed at meeting pent-up demand for civilian goods. Now the boom has gone the other way. That partly explains why heavy products (plates, structurals) are in very tight supply, while light products (tubing, strip, wire) are easier. The biggest factors, of course, are defense and controls.

Aside from defense - capital goods expansion, business has been much quieter in 1952 than had been expected. The year came in like a lamb, still shows no sign of roaring. Here's how it looks:

Retail Sales—Volume has been disappointing. Savings continue to pile up. Some price declines have even failed to stir a buying mood, as consumers wait for still better bargains. Merchandisers still hopefully predict a buying surge, but they are unsure about when and how big—they've found the buying public tricky to figure.

Inventories—Stores and ware-

houses are loaded. Expected shortages of appliances have not developed. Refrigerators, television, dishwashers and some others are extremely wobbly. Efforts are being made to move these sluggish stocks with intensive promotion and selling campaigns which have gained considerable emphasis.

Hardware—Stocks are plentiful. There has been some upgrading of lines, but the complete price range is generally available. Lack of nickel and copper has pinched in a few spots, though product shortages haven't resulted. Alternate materials or lines of merchandise have filled in the gap. Handtools are abundant, with low cost foreign entries showing up in greater quantities. You still have a fairly wide choice of power mowers.

Now, the season when people buy more metal hardware goods is approaching. But dealers and jobbers are thinking in terms of merchandising, rather than shortages.



"Federal Trade Commission says they must be sold as advertised."

There is still quite a bit of inventory speculation, although tighter commercial credit is acting to curb it.

Industrial Purchasing—Inventories are heavy but unbalanced. Purchasing agents have turned cautious. Government restrictions have forced some to pare their buying. Many firms are over permitted limits on some material—at the same time other items are in such short supply as to slow production.

Retail sales will pick up this spring, and they'll probably carry on at a fairly high level. But consumers won't be rushed into buying, nor will they pick the bulging shelves clean.

Spring is a time for buying. Autos, hardware, tools, farm implements, houses, and many other consumer durables always sell faster then. So the next 3 months should give you a pretty good line on how good 1952 will be. If autos and farm implements are sold out early, shortage psychology may spread to other lines. But, right now, consumers aren't impressed.

Basic Expansion—The boom in capital goods is pretty well set. Basic industrial expansion, now under a full head of steam, will continue at a fast pace. Bulwarks of this group are metals, power plants, machine tools, and industrial plants. Behind them is a waiting line of public works, roads, hospitals, schools. Heavy industry will be busy for a long time.

Much of the boom talk is based on these growth factors. Probably not enough attention has been given to softness in many lines of consumer goods. Both are important in gaging business trends. If capital expansion and defense business spur consumer buying—then we'll see a boom in every sense of the word. Meanwhile, there'll be economic soft spots that will sternly test many firms, regardless of the big words used to describe our burgeoning economy.

How Home-Made X-Ray Outfit Works

A home-grown X-ray inspector is providing a valuable measuring tool for checking the gage size of sheet and strip steel. Developed by the A. O. Smith Corp., Milwaukee, the device utilizes an X-ray machine, a fluorescent screen, and a selenium photoelectric cell.

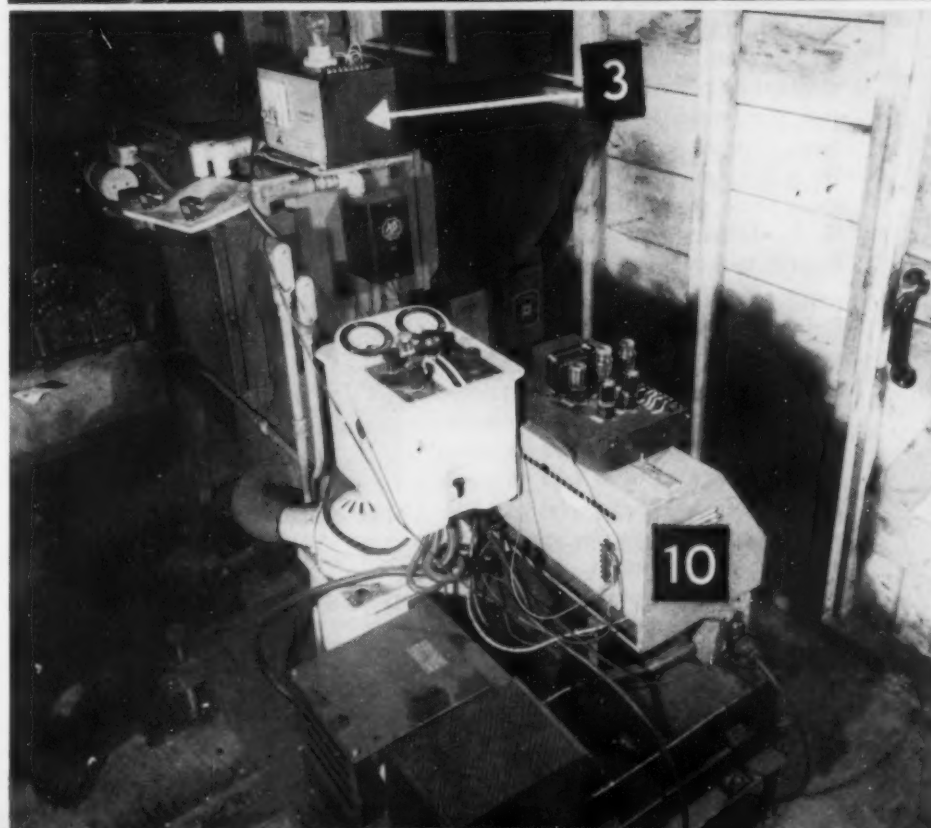
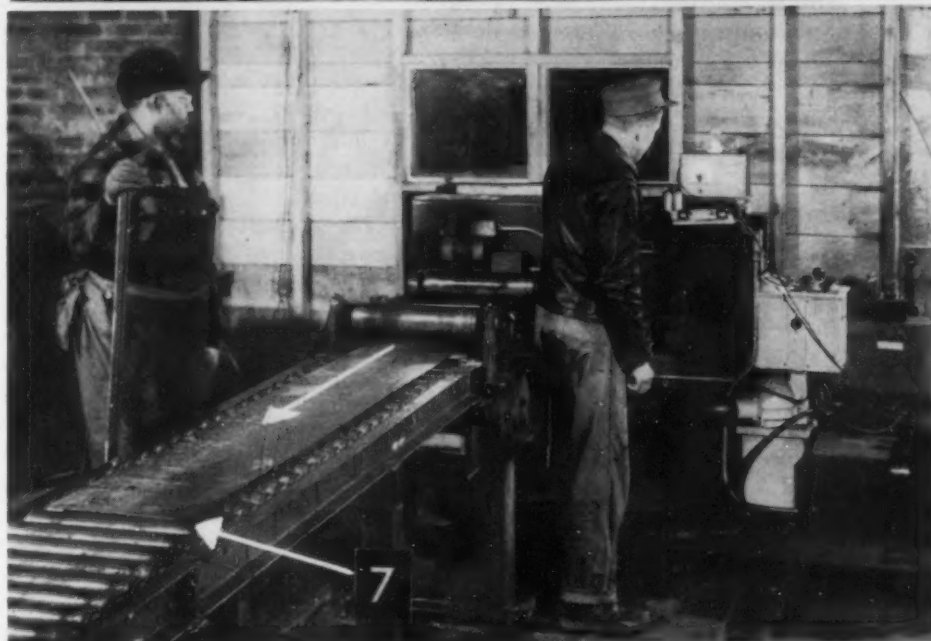
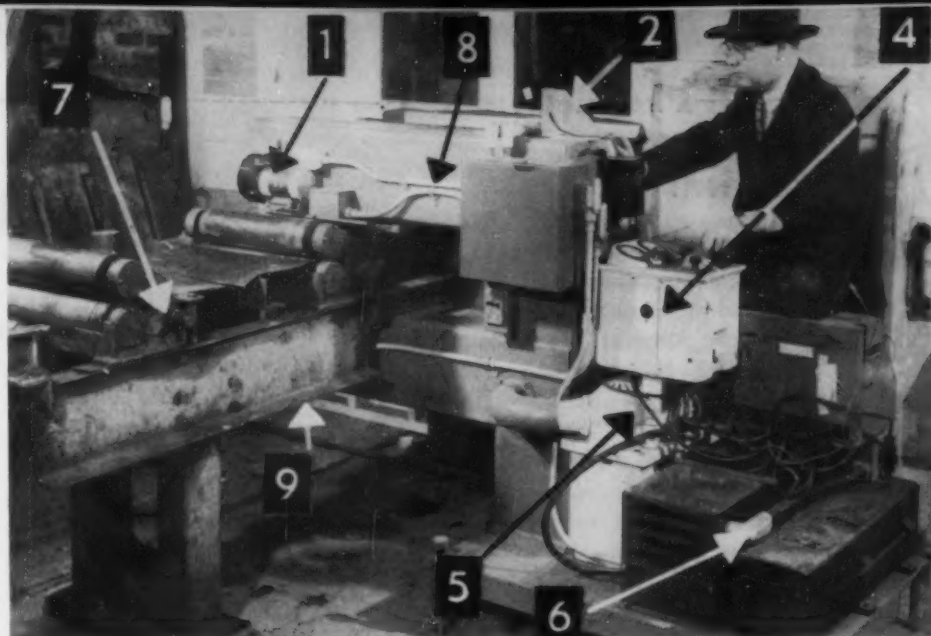
Roentgen rays, passing through a moving sheet of steel, strike a fluorescing screen. This, in converting the X-rays into visible light, indicates by minute changes

1. Fan motor cooling X-ray tube.
2. Meter to register thickness of stock being inspected.
3. Meter relay with indicator light.
4. X-ray tube control cabinet.
5. High voltage transformer for X-ray tube.
6. Power transformers.
7. Power conveyor that moves the strips through the machine.
8. X-ray tube housing.
9. Fluorescent screen and photoelectric cell, not visible in the pictures.
10. Photoelectric cell amplifier cabinet.

in brightness the thickness of the steel that is passing between X-ray source and the fluorescent screen. The relative changes in the screen's brightness are picked up by a photoelectric cell. A calibrated meter indicates whether the steel is within tolerances.

Red Light—In the A. O. Smith application, tolerance limits are indicated on the cell meter, telling the inspector at once whether a specific area of the strip is exceeding allowed tolerances. To further simplify operation, A. O. Smith engineers have added a red light that automatically gives the alarm if a reject comes through.

The "inspector" is a home-cooked appliance, put together by several departments. Despite its apparently casual origin, the compact device allows a 5-man crew to do as much in a half shift as 16 micrometer-equipped inspectors could do in one shift.



TV Plant Tour:

Foote Mineral and RCA show plant activities the comfortable way.

The painless plant tour is the latest word in stockholders' meetings. Foote Mineral Co. tried a television trip through its various plants in different parts of the country to acquaint stockholders and the press with its diversified doings. Radio Corp. of America supplied the sending and receiving apparatus.

This method of showing facilities certainly saves shoe leather and gives insight into many more facets of a company's operations than a normal tour would.

An even dozen 17-in. receivers were placed around the cafeteria of the company's Exton, Pa., plant where the meeting was held. Four image orthicon field cameras were spaced about Foote property to show actual production or processing of various products.

Show Lithium Processing—

While the actual discussions of plant operations seemed a bit strained and amateurish, this only added a bit of humor to the show and forced home the idea that these were really production men talking, not hired actors.

First act showed the processing of African lepidolite (lithium) ore. This mineral is used in special glass for television tubes and in the manufacture of lubricants, ceramics and air conditioning equipment. Next, viewers saw a homemade film on quarrying and processing of spodumene at Kings Mountain, N. C. Lithium salts are obtained from this raw material.

Act three took place again at Exton where further lithium processing and pilot plant operations were televised. Zirconium then took over the spotlight and the audience saw just how this metal is produced. They also were told of some of its unique characteristics. Besides good corrosion resistance and strength-weight ratio, the "new" metal has low neutron absorption making it valuable for atomic energy work and a high gas absorp-

tion factor which is used for increasing vacuum in vacuum tubes.

The final was a tour of facilities for processing welding electrode coating materials, the company's main bread and butter operation.

Spur Michigan Copper Output

New action to spur the production of copper in the upper peninsula of Michigan is about to be taken by the federal government in a "guaranteed market" contract with the White Pines Mining Co.

Defense Materials Procurement Agency has agreed to guarantee purchase of \$28,665,000 worth of copper over a 10-year period if the metal cannot be marketed at profitable prices. The new contract is in addition to the Reconstruction Finance Corp. loan for mine development.

The guaranteed government purchase becomes effective only in the event the company is unable to find purchasers at a special premium price of 25½¢ a lb.

Proposals are under consideration to open new high-cost mines and dewater and reactivate the flooded mines of Calumet and Hecla Copper Co., near Calumet. National Production Authority so far has refused to approve this proposal. Sen. Blair Moody, D., Mich., is urging reconsideration.



NEW SOURCE: Titanium is now in limited production at Henderson, Nev., in a plant built during World War II to turn out magnesium. A chunk of the sponge-like titanium metal that will be cast into ingots is being examined by G. W. Llewellyn of H. K. Ferguson Co. and R. P. Smith, plant manager for Titanium Metals Corp. of America.

Users Attend Heating Conference

The first American Institute of Electrical Engineers conference on induction and dielectric heating was held in Cleveland last week under the sponsorship of an AIEE subcommittee on heating and the Cleveland chapter of the society. Over 350 persons from all sections of the country representing equipment manufacturers, users, and power companies attended the 2-day sessions at the Carter Hotel.

Purpose of the conference was to explore developments and possibilities of induction and dielectric heating for industry. Users from a wide variety of industries had previously attended technical meetings in their own respective fields, but they had never before gathered to discuss problems in this particular phase of their operations. Over one-third of those attending were users. It was hoped from this well-attended conference that such a meeting would become an annual feature of AIEE.

We'll Have Enough Refractories

Production of refractories is now such that there will be no trouble in meeting future demands of the expanding steel and other industries.

This is the joint opinion of the National Production Authority and the refractories industry advisory committee after going over the situation at a recent meeting.

Since late 1950, certificates of necessity involving \$57 million worth of expansion have been granted the industry. It is estimated that industry capacity will have been increased by up to 40 pct over 1948 when the present expansion program is completed.

GM Suggestion Plan Sets Record

The General Motors Employee Suggestion Plan brought a record 140,830 ideas from employees during the year ended Dec. 31, 1951.

Nearly one-fifth—30,758 suggestions—were accepted. For these GM paid its workers \$1,516,533.

JAPAN: Its Plants Want Our Business

Welcome mat is out for U. S. orders, tech help . . . Japanese feel they can sell us machine tools, sub-assemblies, castings, etc. . . Facts on procurement, what's available—By T. Metaxas.

Japan has the welcome mat out for an American invasion—of defense orders from American industry, technical cooperation, and patent privileges to manufacture industrial equipment. Japanese industrialists don't like it but their economy is hypersensitive to the bursts and lulls of the Korean War. Gunfire from across the Sea of Japan was a hypo of adrenalin to the island's depressed industries but the protracted peace talks and the consequent holding war is now a bludgeon.

International Industrial Consultants, four American engineers who set up headquarters in Toyko and Osaka (Box 1671, Baltimore 3, Md.) on discharge from the Army, told THE IRON AGE that the Japanese want to offer their industrial services. Businessmen there know of the production traps of a few specific shortages that exist in America. They know they have some of the materials and industrial capacity we need. And they don't like their dangerous reliance on the nearby war.

Napalm Acres—For instance, acres of napalm aircraft tanks were at latest reports stacked across neat Japanese countryside. Air Force contract tempo, timed to full-scale mayhem, was dislocated by the Korean change of pace. The tanks, many made in Japan, were therefore accumulating.

Peace talks meant hastily cancelled contracts for Japan's industry. It had built thousands of trucks to American ordnance specifications, countless napalm tanks, shoes, uniforms for Occupation authorities.

Industrial Consultants claim Japan can deliver a variety of products that are short in the U. S.

It can ship complete machine tools, either standards or special purpose. Japan can take subcontracts for machine tool components. It can deliver steel, iron, alloy, and nonferrous castings in weights from half a pound to 60 tons—and delivery dates vary from 60 to 90 days, it's claimed.

There is idle tool and die capacity in Japan. Aluminum forging and casting facilities will permit acceptance of substantial U. S. business, Industrial Consultants say.

Nickel from India—Japan is getting regular shipments of nickel ore from India. It can offer some steel products containing nickel, chrome, molybdenum. Industrial Consultants mention as possibilities rolls for rolling mills, plates, crushers for ceramic industries, high chrome content pipe flanges, acid-proof stainless steels.

But Japan does not want to ship out its alloys in commercially pure form. Costs of electric power to produce these alloys have pounded to new highs, and manufacturers feel that these exports would not be economical for either party. But if Japanese manufacturing facilities were turned loose on the strategic raw materials, low cost operations could overcome high power costs and make the price right.

Japan's machine tool builders are particularly anxious to receive

American orders for large and small special purpose machine tools made to U. S. specs. Industrial Consultants say delivery on standard tools runs about 5 months and the price level ranges from 10 to 20 pct below the American. A 3-ft radial drill press delivered to New York, duty and freight paid, sells for \$8500. A similar American tool sells for \$11,000.

Japan is not ignorant of the international legend of inferior quality that accompanies its goods. Much of this disrepute arose from exporting easily-broken trinkets which Japan, produced in prodigious amounts. But quality control today has an invigorated emphasis in Japan.

The government realized that the poor quality label must be erased and now government inspection teams check, approve, or reject products on their way to world markets.

If mimicry is the highest form of compliment then the Japanese have been charting a close course in the wake of American technology. Now that the hate-mongers are no longer in power that unbelievable respect for American industry has returned.

American Help—Under Occupation, Japan has been visited by top American industrial experts as part of the frankly paternalistic policy that the conquered nation is both our Asian bastion against the Reds and our responsibility. Occupation feeling is that we can't accept the benefit without taking on the task.

Japanese industry, through our experts, has been reintroduced to the American way with machines. Now, Japanese manufacturers are trying to set up working agreements with their American counterparts to make some of the machines they don't have the dollar power to buy. One Japanese manufacturer seeking such an arrangement invited a visit of American engineers to see that his production travelled the right track. He offered to pay all expenses.



"I don't care if you are training to be a foreman. Stop pussy-footing up behind me."

QUOTAS: More Relaxation Seen

Pressures for decontrol grow but officials still skeptical on supplies . . . Defense expansion still gets priority . . . NPA boosts minor civilian goods allotments—By A. K. Rannells.

Pressures for decontrol are increasing. And there are signs that the line of regulation is cracking, although control officials are still skeptical of plentiful supplies of controlled materials for months to come. This is particularly true of aluminum and copper.

It is significant, however, that plans for additional limitation, conservation and similar orders are being pushed into the background and more talk is being heard of "relaxation."

A more concrete sign is the fact that the apparent softening market for some types of steel is being recognized by National Production Authority to the extent that head man Henry Fowler says the agency now stands ready to consider requests for increased second quarter allocations—if the applications do not ask for more aluminum or copper.

More Steel—It was indicated that the supplemental allotments under these conditions might include sheet, strip, some wire products, and even light plate and light structurals.

But the promise of softened markets for steel has not changed the picture insofar as the expansion program is concerned, Defense Production Administrator Fleischmann says. Materials to complete and equip authorized plants will continue to get priority.

Meanwhile, late last week, NPA announced a revision of controlled materials allotment schedules for production of civilian consumer goods (except automobiles).

Roughly, NPA has pulled down slightly aluminum and copper allocation levels for the more essential types of goods such as refrigerators, washing machines, etc., in order to boost allocations for the "less essential" goods such as

metal furniture, venetian blinds, athletic goods, and jewelry.

Stay Open — Mr. Fowler says this action will keep thousands of manufacturers from having to close their doors. They had previously been getting about 10 pct of copper requirements and up to perhaps 20 pct of aluminum. Reduction in the other goods to make the more nearly-balanced level amounted to 5 pct.

Under this new formula, manufacturers will still get 50 pct of base-period steel. Those in the more essential class generally will get 30 pct of brass mill, copper foundry, and aluminum products and 35 pct of copper wire mill base. Less essential goods will also be allowed generally the 30 pct of copper and brass, but only 25 pct of aluminum.

Mr. Fowler says that while this represents roughly a cutback of 14 pct for appliances and household goods, he believes the reduced production will be less than 10 pct.

And in any event, he does not look for shortages because a study



"It's not as bad as it looks, Joe. He's smarter than the mail boy who quit."

indicates a good reserve supply of finished goods at inventory levels to meet demand until the third quarter, when allotments might be increased.

Industry Controls This Week

Teflon—Allocation control ended by revocation of Sched. 2, M-45.

Zinc—Amend. 5, CPR 60, allows manufacturers of zinc base die castings to add to their metal costs as much as 2¢ per lb of zinc content of metals used.

Second Quarter CMP Allotments

Second quarter allotments of Controlled Materials Plan metals are shown in the following tables. They are listed by product in terms of percentage of the pre-Korean base period consumption, usually an average quarter of the first half of 1950. Carbon and steel allotments in all cases are set at 50 pct and are not included in the table.

Product	Per Cent			
	Copper Brass Mill Products	Copper Wire Mill Products	Copper Foundry Products	Aluminum Products
Mops & dusters, h. h.	30	35	30	30
Canvas products	10	—	—	15
Milk bottle crates (alum) ..	—	—	—	15
Frames for pictures, mirrors	10	—	—	—
Wood household furniture (except upholstered)	30	—	—	30
Wood household furniture (upholstered)	—	—	—	—
Metal household furniture ..	10	35	10	25
Metal office furniture	30	35	30	30
Public building furniture ...	30	—	30	30
Metal partitions, enclosures	10	—	30	35
Cases, cabinets and counters	30	35	30	30
Metal screen doors, windows	30	35	30	25
Metal storm sash	30	35	30	25
Window shades, accessories	10	—	10	25
Venetian blinds	10	—	—	25
Restaurant furniture	30	35	30	30
Luggage	30	—	30	25
Handbags	25	—	—	25
Flat glass	30	35	30	30
Pottery—N. E. C.	30	35	30	30
Abrasive products (scouring pads)	20	25	—	25
Insulation, aluminum powder	30	35	30	30
Tumblers and thin-wall containers (aluminum)	—	—	—	25
Tinware, cooking, heating (except cans)	—	—	—	30
Cutlery	30	—	—	30
Razors and blades	30	—	—	30
Furniture and cabinet hardware	10	—	30	25
Vacuum jugs	10	—	10	25
Fireplace equipment	10	—	10	25
Radio hardware	30	35	30	30
Luggage hardware	25	—	25	25
Shower doors and sprinklers	30	35	30	30
Domestic cooking stoves (non-electric)	30	35	30	30
Ladders, metal, domestic ..	30	35	30	30
Shutters	30	35	30	30
Trim metal mold	30	35	30	30
Store fronts	30	35	30	30

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Copper Foundry
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Product

Copper Brass
Mill Products
Copper Wire
Mill Products
Copper Foundry
Products
Aluminum
Products

Per Cent

Aluminum roofing and siding	—	—	25
Aluminum awnings	30	35	30
Enamel cooking utensils	30	35	30
Vitreous enameled products	30	35	—
Closures	17	—	25
Stamped and pressed metal	10	35	10
Aluminum ice cube trays	—	—	30
Domestic cooking and kitchen utensils	30	—	30
Portable lamps	10	35	30
Wire products N.E.C.	10	—	25
Beer barrels (alum.)	—	—	25
Insulation, alum. foil	—	—	30
Aluminum foil (household, etc.)	—	—	25
Fabricated metal products N.E.C.	10	35	10
Garden tractors	30	35	30
Lawn mowers	30	35	30
Power-driven hand tools (home workshop)	30	35	30
Woodworking machinery (home workshop)	30	35	30
Automatic merchandising machines	30	35	30
Amusement and other coin- operated machines	30	35	30
Washing machines	30	35	30
Laundry equipment, etc.	30	35	30
Sewing machines	30	35	30
Vacuum cleaners	30	35	30
Mechanical refrigerators	30	35	30
Farm, home freezers	30	35	30
Carpet sweepers	10	—	25
Water treatment equipment (dom.)	30	35	30
Floor polishers	30	35	30
Dishwashers (dom.)	30	35	30
Disposers	30	35	30
Amusement park rides	10	35	10
Domestic cord sets	30	35	30
Toy and door bell trans- formers	30	35	30
Electric fans	30	35	30
Small hhd. appliances	30	35	30
Electric razors	30	35	30
Domestic elec. cooking stoves	30	35	30
Phonograph needles & cut- ting styli	30	35	30
Hhd. radio receivers, tele- vision sets	30	35	12.5
Coin-operated phonographs	30	35	30
TV & auto. antennas, excl. replacement	30	35	30
Recording blanks, disc com- mercial	30	35	30
Lighting outfits, nec.	10	35	—
Accessories for motor vehi- cles & trailers	30	35	30
Boats, civilian	30	35	30
Motorcycles & bicycles	30	35	30
Amateur photographic equip- ment and supplies	30	35	30
Jewelers' findings	30	—	25
Flatware	30	—	30
Hollowware	30	—	10
Pianos	30	—	30
Organs	30	35	30
Musical instruments	30	35	30
Models	30	35	30
Toys and games (exc. models)	10	35	10
Baby carriages, etc.	30	—	30
Wheeled goods (exc. baby carriages)	10	—	—
Fishing tackle	30	35	30
Sporting and athletic goods	10	35	10
Fountain pens and mechani- cal pencils	30	—	30
Wood case pencils	10	—	—
Artists' materials	10	—	25
Costume jewelry, novelties	25	—	25
Buttons	30	—	30
Needles, pins, zippers, etc.	30	—	30
Jewelry cases	10	—	25
Morticians' goods	30	—	30
Beauty and barber shop equipment	30	35	30
Signs, advertising displays	10	35	10
Umbrellas and cases	10	—	10
Pipes and cigarette holders	—	—	25
Soda fountain equipment, etc.	30	35	30
Office supplies	30	—	30
Lighters	25	—	25
Christmas decorations	30	—	25
Squeeges	30	—	—
Church goods, etc.	30	—	30

Not One Cent for BUCKEYE Tool Maintenance!



TOOL SERVICE RECORD

Tool.....BUCKEYE Vertical Sander
Power.....Air
Capacity.....9" Pad
Speed.....4500 RPM
Job.....Weld grinding and
abrasive cutting

TOTAL TOOL MAINTENANCE AND REPAIR COSTS

April 1950—
January 1952.....\$0.00

In April, 1950, a Buckeye vertical sander was purchased for use in the shop of a leading textile plant. The tool was chosen for its greater power output and for its adaptability to a wide variety of grinding and sanding jobs.

By January, 1952, this Buckeye sander proved to have still another advantage: In twenty months of continuous service, not one cent had been spent for tool repairs!

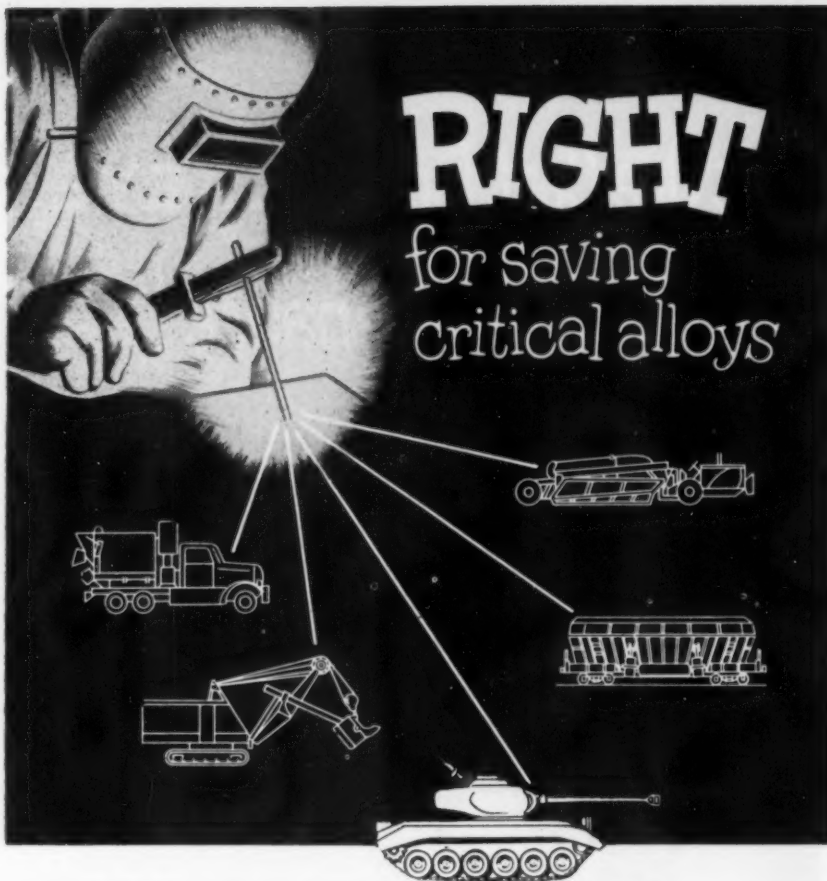
The Master Mechanic has just bought a second Buckeye sander, chiefly because: "If two jobs requiring the use of a sander are in process at the same time, the men prefer to wait until the Buckeye tool is available."

Still not using Buckeye tools in your plant? You could be missing out on real savings, on production costs as well as maintenance. It will cost you nothing to try Buckeye—on your own job—without any obligation.

Buckeye Tools
CORPORATION
DIVISION 11 • DAYTON 1, OHIO

Portable Air
and Electric tools
for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario



RIGHT
for saving
critical alloys

ARCOS Low Hydrogen Electrodes weld high tensile steel with savings in chromium and nickel

ARCOS LOW HYDROGEN ELECTRODES

Tensilend 70
Tensilend 100
Tensilend 120
Manganend 1M
Manganend 2M
Nickend 2
Chromend 1M
Chromend 2M

Time and service have proved the effectiveness of welding high tensile steel with Low Hydrogen Electrodes. And today's heavy demands for freeing critical alloys make their use more timely than ever before.

First developed in 1942, Arcos Low Hydrogen Electrodes are subjected to the same rigid quality controls as applied to its Stainless. That's your assurance of uniform, high quality weld metal for use on armor and other commercial applications. It means sound, dependable welds on every job, every time. Arcos offers the most complete selection of Low Hydrogen Electrodes in the field.

ARCOS CORPORATION • 1500 South 50th St., Philadelphia 43, Penna.



Write for new booklet "The ABC's
of Welding High Tensile Steels"

**WELD
WITH
ARCOS**

Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes



Controls

House Trailer Allocations Fixed

Controlled - materials allocations to the house trailer industry should permit the first-half output for 1952 to reach about 27,000 vehicles, National Production Authority sources said last week.

NPA has allocated 20,943 tons of carbon steel, 3,581,000 lb of aluminum, 193,000 lb of brass mill products, and 145,781 lb of copper wire to the industry for use during the first six months.

This is about 25 pct less than the industry wants. Representatives of the trailer coach manufacturers recently told NPA that in view of demands for coaches for housing of service people and defense workers, the minimum production volume should be no less than 17,000 units per quarter.

Industry spokesmen say that 93 pct of current production is going for emergency defense and military housing.

Zinc Die Casting Prices Boosted

Manufacturers of zinc base die castings may add to their metal costs as much as 2¢ per lb of zinc content of metals used, government pricers have ruled.

This adjustment affecting ceiling prices of castings was required because producers' earnings are below the minimum required by the industry earnings standard applied by Office of Price Stabilization.

OPS authorized reflection of cost increases by means of Amendment 5, Ceiling Price Reg. 60, effective Feb. 19. The action is an interim measure, applicable while the agency completes a study of the general equitability of die castings price ceilings.

Industry Opinion Asked on Forms

Industry opinion will be tested by Office of Price Stabilization before the agency issues reporting forms to cover application for pricing of new goods under a durable goods regulation now being drafted.

A 14-man group from the durable goods manufacturing industry has conferred with OPS officials on the proposed regulation, which will

replace Sections 30-34 (new commodities) of Ceiling Price Reg. 22. This representation will have an advance look at the reporting forms.

Some members of the group told pricers they believed an amendment to CPR 22 would provide adequate coverage of new goods. Generally, however, members agreed the proposed order would be an improvement over Sections 30-34.

Cut Steel for Prefab Houses

Second-quarter allotments of carbon steel for prefabricated housing have been reduced to 85,000 tons, a drop of 18,000 tons from first quarter. Military orders must come out of this total.

Industry members are asking higher allocations of cold-rolled strip and sheet for the third and fourth quarters on the basis of this being their peak season.

While national production authority has made no commitments, officials are expecting supplies of galvanized sheet to have increased 35 pct by the beginning of the third quarter.

Ease Public Building Curbs

Start of work on 645 religious, municipal and community building projects involving an estimated cost of more than \$218 million was approved by the National Production Authority last week.

No controlled materials will be made available during the second quarter, however. But 44,000 tons of carbon steel, 13,600 tons of structural steel, and 577 tons of copper products will be earmarked for their use during the last half.

Teflon Quota Controls Ended

National Production Authority has ended allocation control over poly tetra-fluor ethylene—"Teflon." (Sched. 2 to M-45 revoked.)

Increased production, plus lower military demand, made decontrol possible, NPA says.

Poly tetra-fluor ethylene is a moldable, plastic material used in high-temperature wire insulation, cable connectors, electronic fittings, and in industrial gaskets.

CONSISTENT welding results



ARCOS Stainless Electrodes assure you quality weld metal—easily deposited—time after time

You know the need today for producing sound, dependable welds on every job. It can mean savings in time, money and electrodes.

Benefits like these are yours with every box of Arcos Stainless Electrodes you receive. For each is backed by quality control tests more rigid than anywhere in the industry. That's why you can always count on Arcos for weld metal that is chemically, physically, and metallurgically of the highest type. It assures you of improved welding performance . . . more dependable results at lower weld costs.

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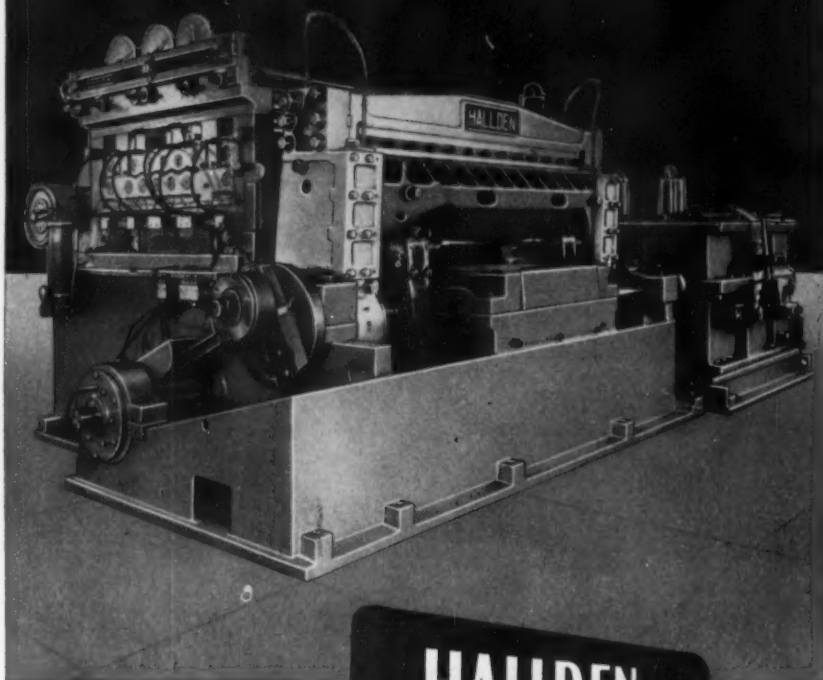
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ARCOS

Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes



SHEAR EFFICIENCY



HALLDEN
Automatic Shears

Hallden Machines are designed to give modern steel mills maximum efficiency in flattening and cutting off operations. They permit continuous feed of metal through the machine at accelerated speeds while maintaining precision cutting accuracy. Low center of gravity, rugged construction and compactness assure uninterrupted operation. Remember, too, that Hallden Shears are completely automatic.

Take your shearing problems to Hallden,
the shearing specialists.

THE HALLDEN MACHINE COMPANY THOMASTON, CONNECTICUT

Sales Representatives

The Wean Engineering Co., Inc., Warren, O. T. E. Dodds, Pittsburgh, Pa.
W. H. A. Robertson & Co., Ltd., Bedford, England

Financial

SDPA Plans Small Firm Tax Aid

Tax amortization benefits should become more readily available to small businesses under terms of a 2-point plan outlined by Small Defense Plants Administration.

The agency plan calls for a "set-aside" of a fair share of any projected industrial expansion program, to be held for a "reasonable" time for qualified small firms. In addition, it recommends a better guide in providing separate treatment of applications for certificates of necessity from small businesses.

Size of the set-aside, or reserve, would depend on the proportion of an industry's total capacity held by small firms prior to June, 1950. Another factor would be the distribution of certificates already issued to companies.

Size Not Cost—SDPA Chief Telford Taylor has advanced the view that size of the applying firm, rather than cost of proposed construction, should provide a guide for separate treatment of applications. He also has recommended that the U. S. refrain from distributing certificates of necessity on a first-come, first-served basis.

Crucible, Rotary List Earnings

Net income of the Crucible Steel Company of America and its subsidiaries increased from \$6,311,000 in 1950 to \$8,363,000 in 1951 after income taxes and charges on the funded debt.

After dividends of \$5.00 per share on the five pct convertible preferred stock, the net income yielded \$11.89 per share on the 574,361 shares of outstanding common stock.

Net sales of Crucible in 1951 were \$202,868,000 compared with \$147,705,000 in 1950.

Rotary Electric Steel Co. reports net earnings of \$2,482,974 or \$8.55 per share.

Income and excess profit taxes increased from \$1,910,000 in 1950 to \$5,015,000 during 1951. Investment by Rotary in property, plant and equipment has increased from a little over \$1 million in 1945 to nearly \$10 million last year.

Defense Contracts

Buying:

Defense Dept. sets procedures for overseas war procurement.

Principal items which the military will buy abroad through the new Overseas Defense Production program will be small craft and auxiliary vessels, ammunition items, spare parts for some combat and transport vehicles, and certain aircraft spare parts.

The Army, Navy and Air Force have labelled a total of about \$620 million for offshore procurement from fiscal year 1952 Mutual Security funds. This amount represents approximately 11 pct of the fiscal 1952 foreign military aid appropriation, Defense Dept. says.

Similar Methods — Buying will be performed "generally" under joint regulations used for military procurement in this country. Contracts may be placed on either a government-to-government basis, or between the U. S. government and individual manufacturers. Contractors can be European firms, or overseas subsidiaries of U. S. companies.

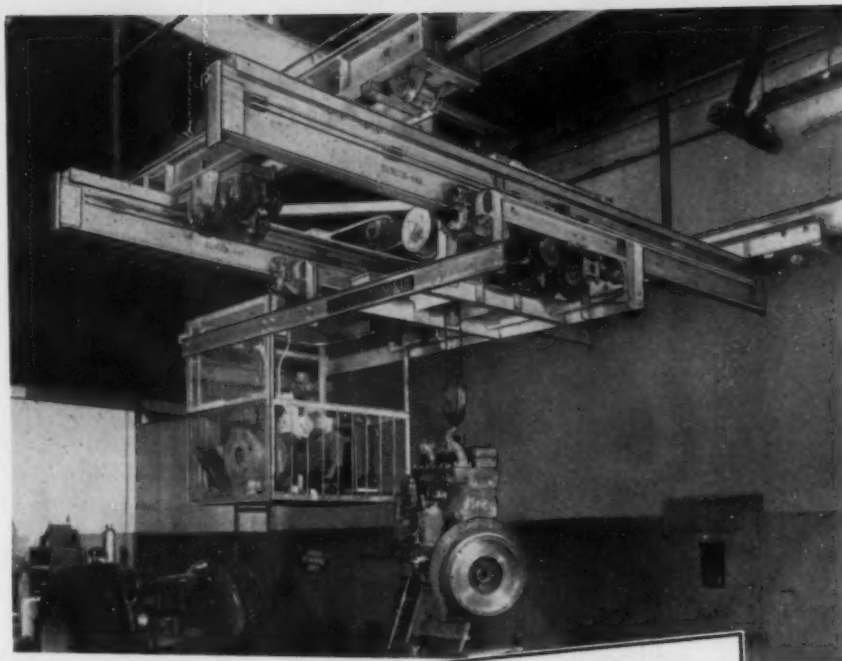
Prices paid must be justifiable in comparison to prices for similar procurement in this country according to Defense Dept. European contractors must be able to make delivery within stipulated time limits.

The Army will act as executive agency for coordinating ODP procurement activities. European Command headquarters at Heidelberg will direct Army buying. Navy procurement will be handled by Navy Purchasing Office, London, and Air Force procurement by U. S. Forces, Europe, in Wiesbaden.

Get Dock Barge Contracts

L. B. Delong and Semco Corp., Panama City, Fla., is beginning work on an unnamed number of spud dock barges, under terms of an army transportation corps contract amounting to about \$15 million.

Barges will be used as semi-permanent piers by the corps to improve harbor operations in moving military equipment.



here's the crane for . . .

CONSTANT SERVICE at HIGH SPEED

If your handling operations must be "on the go—all the time—and fast" then investigate this American MonoRail Crane. With constant service at high speed, it offers the advantages of rugged construction, low-cost operation and quick installation.

The big reason is articulated trolleys. Each trolley wheel carries its share of the load in perfect alignment with the craneway tracks. All possible friction is eliminated. The result is perfectly articulated trolley travel. Articulated trolleys permit operating speeds of 500 feet per minute under constant service.

SEND FOR BULLETIN C-1

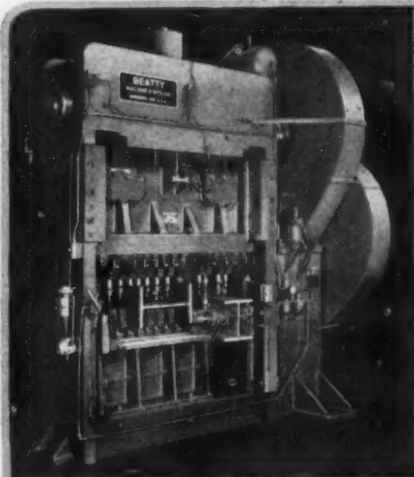
THE AMERICAN MONORAIL COMPANY

13103 ATHENS AVENUE

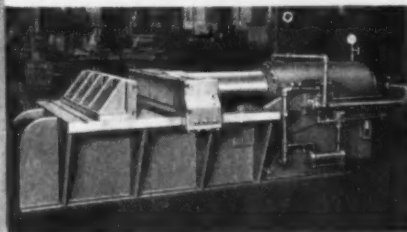
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February 28, 1952

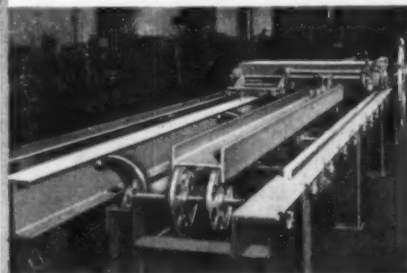
BEATTY machine parade



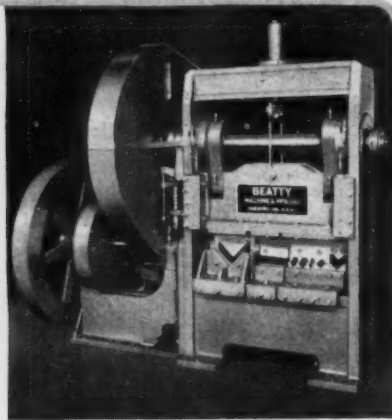
BEATTY No. 9 Guillotine Beam Punch for flange and web punching of beams up to 30"



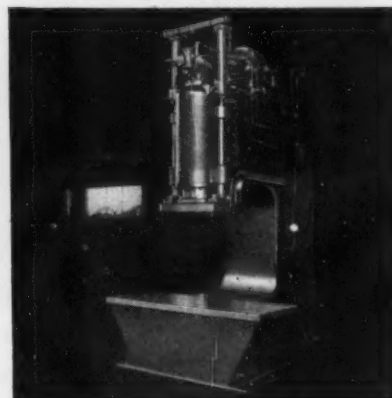
BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging, bending.



BEATTY Spacing Table handles flange and web punching of beams without roll adjustment.



BEATTY Guillotine Bar Shear for "short-order" shearing of flats, squares, rounds without changing tools.



BEATTY 250-ton Gap Press for forming, bending, flanging and pressing.



BEATTY Horizontal Multiple Punch for punching holes horizontally through a vertical flange of long, wide sheets.

BEATTY

Machine & Mfg. Co.

Hammond, Indiana

The experience we've gained in designing hundreds of original, tailor-made machines makes a Beatty proposal especially valuable. The six machines illustrated reflect that broad experience. One of these may not fit your particular needs, but Beatty engineers can design a machine that will. Why not let us have your problem to study.

Defense Contracts

Contracts Reported Last Week

Including description, quantity, dollar value, contractor and address:

Aircraft hardware, \$704,220, Geo. K. Garrett Co., Philadelphia.
Parts for screwjacks, \$97,670, Larr, Inc., Grand Rapids.
Maintenance parts, \$97,763, Penco Products, Bedford, Ohio.
Timer, camera, 450 ea., \$44,653, A. U. Raydon Co., Waterbury, Conn.
Drill press, \$662,378, C. H. Gosiger Machinery Co., Dayton.
Spare parts, \$43,758, Bendix Aviation Corp., South Bend, Ind.
Misc. spares, \$50,000, Aircooled Motors, Inc., Syracuse, N. Y.
Spare parts, 10 ea., \$174,664, Gibbs Mfg. & Research Corp., Janesville, Wis.
True airspeed & Mach. no computer, \$32,256, Standard Coil Products Co., Inc., Kollman Instrument Corp., Elmhurst, N. Y.
Roller bearings, \$404,450, General Motors Corp., Harrison, N. J.
Maat, 940 ea., \$200,972, Pfaff & Kendall, Newark, N. J.
Machinery & equip., \$224,006, National Die Casting Co., Chicago.
Machinery & equip., \$170,640, General Motors Corp., Detroit.
Wheel assy, \$171,094, The Bendix Aviation Corp., South Bend, Ind.
Indicators, 3012 ea., \$144,525, Sunbeam Corp., Chicago.
Wheel assy, \$194,957, The B. F. Goodrich Co., Akron, Ohio.
Spare parts, \$50,865, Bendix Aviation Corp., Teterboro, N. J.
Special bus transfer switches, 185, \$142,232, Automatic Switch Co., Orange, N. J.
Machine dishwashing, 73, \$175,385 est, The-singer Machine Co., Phila.
Radio frequency wattmeter ME-11/U exceeds \$250,000, Electric Impulse Lab., Red Bank, N. J.
Steering gear followup systems, 23, \$107,470, Hyde Windlass Co., Bath, Me.
Degaussing Control cabinets, 96, \$93,888, Federal Electric Products Co., Newark, N. J.
Windlass, anchor, 10, \$151,190, J. D. Christian Engineers, San Francisco, Cal.
Flashlight, 110,000 ea., \$137,500, Bridgeport Metal Goods Mfg. Co., Bridgeport, Conn.
Radio set, exceeds \$250,000, AVCO Mfg. Co., Cincinnati.
Radiosonde, exceeds \$250,000, Bendix Aviation Corp., Baltimore.
Radiosonde, exceeds \$250,000, Johnson Service Co., Milwaukee, Wis.
Test set, teletypewriter, 288, \$234,828, McElroy Mfg. Co., Littleton, Mass.
Flashlight, 110,000 ea., \$142,670, Blake Mfg. Corp., Madison, Wis.
Flashlight, 176,594 ea., \$249,881, Gits Molding Corp., Chicago.
Dynamotor, exceeds \$250,000, Industrial Spring Corp., Chicago.
Misc. teletype parts, 190 ea., \$247,783, Teletype Corp., Chicago.
Reperforator transmitter, exceeds \$250,000, Teletype Corp., Chicago.
Lathes, motor driven, 6, \$310,512, The R. K. LeBlond Machine Tool Co., Cincinnati.
Trucks, fork lift, 412, exceeds \$250,000, Service Caster & Truck Corp., Albion, Mich.
Spare parts for special purpose, var., \$56,996, American Machine & Metals, Inc., East Moline, Ill.
Spare parts for materials handling equip., var., \$33,542, Floyd A. Holes Co., Bedford, Ohio.
Spart parts for materials handling equip., var., \$42,731, Continental Motors Corp., Muskegon, Mich.
Spare parts for materials handling equip., var., \$34,202, Clark Equip Co., Battle Creek, Mich.
Repair parts for gasoline engines, 17,902, \$67,034, ACF Brill Motors Co., Phila.
Valves & repair parts, 4032, \$41,578, Grove Controls, Inc., Emeryville, Cal.
Rudder & stock, 500, \$29,905, Salem Foundry & Machine Works, Inc., Salem, Va.
Repair parts for rotary pumps, 1159, \$41,772, Northern Ordnance, Inc., Minneapolis.
Sling, chain, 3070 ea., \$61,400, Johnson Farmer Chain Co., Lebanon, Pa.
Turnbuckle, steel forged, 14,750 ea., \$33,335, The Upton Walton Co., Cleveland.
Turnbuckle, steel, forged, 51,000 ea., \$189,157, Merrill Bros., Maspeth, N. Y.
Spare parts, var., \$100,000, Caterpillar Tractor Co., Peoria, Ill.
Flashlight, 140,000 ea., \$186,200, Niagara Searchlight Corp., Buffalo.

THE IRON AGE

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation, No. or proposal, and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Naval Supply Depot, Mechanicsburg, Pa.
Main line shaft bearings, 239 ea., 72-23767B, Mar. 17.

Navy Purchasing Office, Washington
Container fuse, 70000, 59200B, Mar. 25.
Files, flat, 1376, 5891B, Mar. 6.
Oilers pump, 40856, 5896B, Mar. 3.
Knives, electricians, 15,450, 5893B, Mar. 7.
Screwdrivers, electricians, 108,604, 5899B, Mar. 4.
Plummet, 3502, 5903-O-B, Mar. 11.
Steel spar, 135, 5909-O-B, Mar. 27.
Projectile plug steel, 618,000, 5914-O-B, Mar. 18.
Wire sling, 550, 5915-O-B, Mar. 20.
Dummy nose fuse steel, 83,630, 5916-O-B, Mar. 12.
Suspension bands for A/C parachute flares, 30,000, 5922-O-B, Mar. 26.
Shelving steel closed, 2 lots, 3474Q, Mar. 6.

Sacramento Signal Depot, Sacramento, Calif.
Truck steel shelf, 305 ea. (1FB8137-PS-52B), Mar. 17.

Signal Corps Supply Agency, Philadelphia
Psychrometer, 650 ea., 10484-05Q, Mar. 7.
RF transformers, 3650 ea., 11943-23Q, Mar. 3.

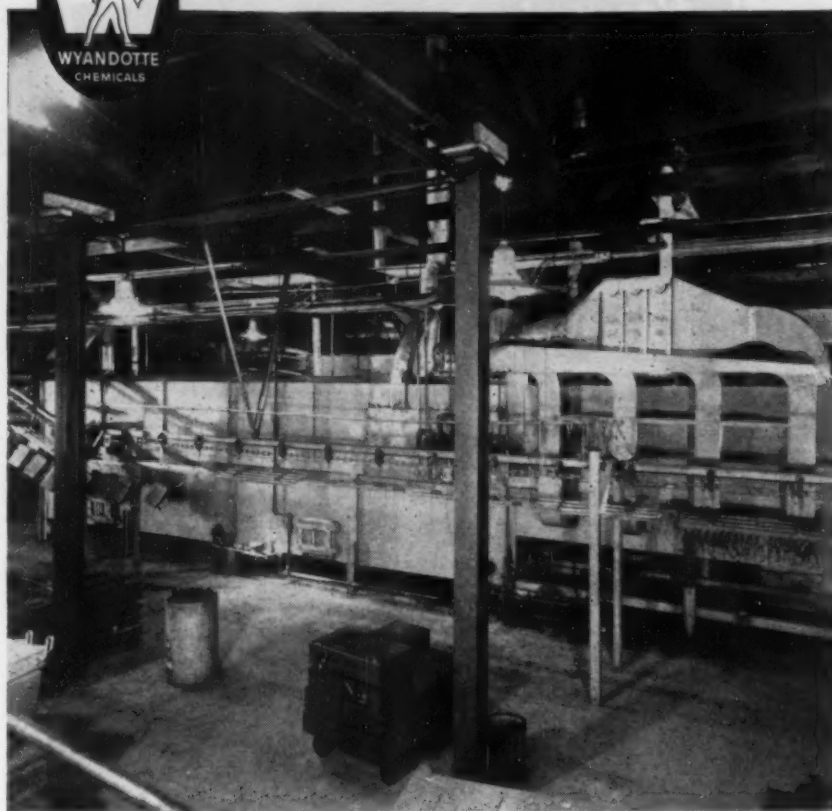
Ordinance Tank Automotive Center, Detroit
Carrier boom pivot worm shaft bearing assy, 330 ea., 52-1466B, Mar. 12.
Stud boom winch drum rope clamp, 100 ea., 52-1466B, Mar. 12.
Pin shear winch driving shaft assy, 1000 ea., 52-1466B, Mar. 12.
Shaft hoist pump propeller assy, 1238 ea., 52-1466B, Mar. 12.
Rod tube rear spring seat connection, 1600 ea., 52-1590B, Mar. 12.
Leaf rebound springs, 1800 ea., 52-1590B, Mar. 12.
Cap filler master brake cyl., 2000 ea., 52-1590B, Mar. 12.
Stud rear wheel, 1000 ea., 52-1590B, Mar. 12.
Pushing frt spring, 2700 ea., 52-1590B, Mar. 12.
Disc assy propeller shaft brake, 1300 ea., 52-1590B, Mar. 12.
Bolt eye rear shock absorber line, 13,000, 52-1590B, Mar. 12.
Pushing mounting tail lgt, 6500 ea., 52-1245B, Mar. 12.
Sleeve speedometer, 2600 ea., 52-1245B, Mar. 12.
Knob eng fuel selector valve assy, 3500 ea., 52-1245B, Mar. 12.
Clevis eng gen mounting cradle, 5000 ea., 52-1245B, Mar. 12.
Gear second speed w/g bearing assy, 1700, 52-1759B, Mar. 21.
Kit repair frt hyd brake wheel cyl, 61,000, 52-1678B, Mar. 24.
Yoke rod end adjustable piston push rod, 3800, 52-1678B, Mar. 24.
Clamp retaining power take off, 7000 ea., 52-1467B, Mar. 12.

Watervliet Arsenal, Watervliet, N. Y.
Steel head assy, 1700 ea., 52-119B, Mar. 13.
Steel gear-part for 120MM gun, 220 ea., 52-190B, Mar. 17.
Steel lever part for 120MM gun, 6500 ea., 52-190B, Mar. 17.
Steel cam assys for 120MM gun, 1000 ea., 52-190B, Mar. 17.
Steel spring part for 120MM gun, 2000 ea., 52-190B, Mar. 17.

Frankford Arsenal, Philadelphia
Spare parts for gunners quadrant M1 and M1 tel M30, var 5 itms, Ord-52-467, Mar. 12.
Spare part misc. maintenance, var, Ord-52-459, Mar. 12.
Spare parts for telescope elbow M-17, 2000 ea., Ord-52-461, Mar. 13.
Parts for fuse setter M13, var, 14 itms, Ord-52-464, Mar. 13.
Spare part for periscope M-10 M-16, 26 itms, var, Ord-52-467, Mar. 14.
Maintenance parts for telescope M82, var, 2 itms, Ord-52-470, Mar. 14.
Spare parts for telescope observation M49, var, 11 itms, Ord-52-477, Mar. 14.



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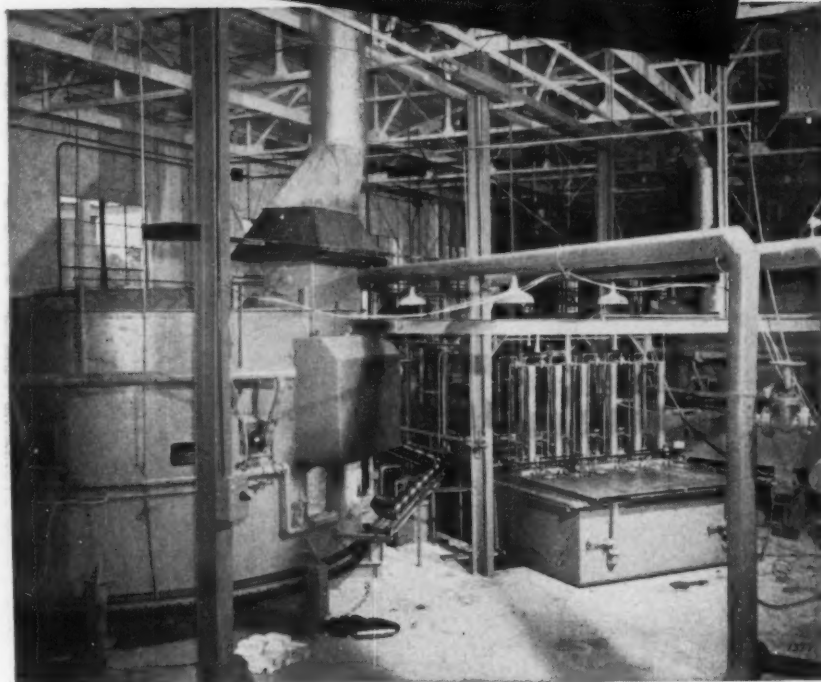
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Construction

Steel Inquiries and Awards

Fabricated Steel Awards this week include the following:

- 7500 Tons, Schenectady, N. Y., warehouses Schenectady General Depot, through Ring Construction Co., to Hare Structural Steel Co.
- 2400 Tons, Philadelphia, extension and modification of Broad Street Station, Pennsylvania Railroad, Belmont Iron Works, same city, low bidder.
- 440 Tons, Milwaukee, Bridge F-03-1/23, to Milwaukee Bridge Co.
- 325 Tons, West Morrisville, Pa., locomotive and car facilities building, Pennsylvania Railroad, to Keystone Steel Structures, Trenton, N. J.
- 280 Tons, Minnehaha and Moody Counties, S. D. bridge F-12-8, to Egger-Scudder Co.
- 120 Tons, Bedford, Billerica and Burlington, Mass., bituminous concrete and reinforced concrete frame bridge and two steel stringer bridges, Peter Salvucci, Waltham, Mass., low bidder.

Fabricated Steel Inquiries this week include the following:

- 6000 Tons, Hudson County, N. J., superstructure of Hackensack River bridge, New Jersey State Highway Dept., bids due Apr. 1.
- 1140 Tons, Chicago, University of Illinois Pharmacy Bldg.
- 635 Tons, Bergen County, N. J., widening of bridge, New Jersey State Highway Dept., bids due Mar. 11.
- 480 Tons, Racine County, Wis., Bridge.
- 430 Tons, Tama County, Ia., Bridge 988/3/.
- 200 Tons, La Crosse County, Wis., Bridge U5-101-6/.
- 200 Tons, Morrisville, Pa., miscellaneous buildings, Fairless Works, U. S. Steel Corp., bids due Mar. 15.

Reinforcing Bar Awards this week include the following:

- 1350 Tons, York, Pa., city sewage treatment plant, McElwee-Courbis Construction Co., Camden, N. J., and Ertel Construction Co., Camden, joint low bidding general contractors.
- 155 Tons, Bedford, Burlington and Billerica, Mass., bituminous concrete and reinforced concrete frame bridge and two steel stringer bridges, Peter Salvucci, Waltham, low bidder.

Right to Complete Buildings

National Production Authority this week gave the green light for resuming construction work on partially-built structures, except those for amusement and recreation. Allotments of materials will be made available the second quarter.

A revision in government construction regulations, due to be announced early in March, will increase the amount of steel for non-industrial type buildings which can be self-certified from the presently allowed 2 tons to 5 tons. Only 2 tons may be structural or any wide-flange beams.

Also, the proposed housing regulations will be ready early in March. As they now stand, single-family dwellings will not be permitted to use more than 1800 lb of steel and 35 lb of copper in steel water systems. For copper water systems, use of copper is limited to 135 lb and steel to 1450 lb.

This Week in Washington

Will Union Shop Be Forced on Steel?

Industry members plan fight to the finish in WSB . . . Steelworkers continue to press for union shop . . . Truman approves U. S. unemployment aid . . . Export trade slips—By G. H. Baker.

Industry members of the Wage Stabilization Board are making it increasingly clear that they plan a fight to the finish on the current union-shop issue.

Issue of whether or not union shops should be rammed down the throats of the nation's steel and railroad industries is hotter this week than at any time for years, because of: (1) Repeated demands from Phil Murray's United Steelworkers (CIO) that steel producers be forced to sign union shop agreements; and (2) the recommendation of one of President Truman's fact-finding boards that railroads be forced to grant union shops to 1 million non-operating rail employees.

Used Against Steel—Mr. Murray believes that if the latter recommendation is put into practice in the railroad industry, he will gain greater leverage in his demands against the steel industry.

Hiram S. Hall, Senator member of the WSB industry delegation, predicts "considerable debate" when the union-shop issue comes formally before the wage board.

Nathan P. Feinsinger, WSB chairman, counters Sen. Hall's statement with the assertion that there is "no question" that WSB should make specific recommendations for or against union shops. "This board, as a board, isn't going to duck anything," he says.

Unemployment Relief — Congressmen who have been urging federal financial aid to States in which there is considerable unemployment are heartened by President Truman's recently announced support of their plan.

Senator Blair Moody, D., Mich.,

is "on the right track" in urging federal legislation to increase State unemployment benefits, Mr. Truman has stated.

It seems unlikely, however, that Congress as a whole is ready to encroach further at this time into the area of State relief operations. There is a widespread feeling at the Capitol that unemployment relief should remain a function of State governments, and that Washington should resist the temptation to dabble further into what are strictly local or regional problems.

A bill sponsored by Sen. Moody provides for supplementary federal benefits equal to 50 pct of the state benefit but limiting total benefit to 65 pct of the beneficiary's pay rate.

Sense into Spending—A group of Senate Republicans is backing a new move to force the Administration to live within its income.

Senator Zales Ecton, R., Mont.,



one of the sponsors of the upper-chamber resolution, points out that the proposal would help Congress resist pressure groups.

Under the terms of the resolution, Congress would limit appropriations for government operations so that total expenditures would not exceed estimated revenues for the fiscal year ending June 30, 1953. And they concede that a war declared by Congress would have the effect of nullifying the plan.

Mr. Ecton is reminding his colleagues that "we cannot go blindly on and on and meet all requests for expenditures and expect to balance the budget."

Others who have pledged support for the Ecton plan are Senators Styles Bridges, R., N. H.; Homer Ferguson, R., Mich., and Robert C. Hendrickson, R., N. J.

Export Doldrums—The lively export trade that many European steel producers enjoyed with U. S. consumers in 1950 and 1951 is fast slipping into the doldrums.

Government metals experts attribute the sharp decline in recent months to (1) improved domestic supplies of many steel products, and (2) the uncertain delivery dates of imports.

Allocations through CMP discourage purchase of foreign steel at higher prices. A manufacturer, whose production quota is limited, would rather get his steel through CMP at U. S. prices.

U. S. customers found they were forced to wait 6 months to 1 year for deliveries of European steel. And all of them held doubt as to whether or not they would be able to absorb price rises and stay under domestic price ceilings on finished products.

Steelmakers in West Germany, France, Belgium, and Luxembourg enjoyed an unusual but profitable market during this favorable export period, U. S. trade officials comment. They gained badly-needed U. S. dollars.

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DIVIDENDS: Gain's Not Inspiring

Stockholder dividends for 1951 don't come up to expectations . . . \$100 million below estimate and just \$200 million over 1951 . . . Steel slips but auto payments take worst beating.

Tax collectors who had been looking forward to a greatly increased take from 1951 stockholder dividends are getting a rude shock instead.

Corporation dividends for 1951 probably did not exceed the 1950 total by more than \$200 million. The relatively small increase is spread among hundreds of thousands of stockholders.

This figure is based on the report by the U. S. Office of Business Economics, which gives the total publicly reported cash dividend payments for last year at \$8053 million—a rise of only \$129 million above the 1950 figure. The OBE figure represents roughly 65 pct of all such payments.

Advisers Off Base—The estimated \$200 million is one-third less than the \$300 million increase estimated by President Truman's Council of Economic Advisers in its February report to the Senate-House Committee on the Economic Report.

Significant dividend drops were recorded for steel and five other major industries. Included was the automobile industry and manufacture of machinery, including electrical.

Steel dividends, as reported by OBE, amounted to only \$477.5 million in 1951 as compared with \$488.6 million in 1950—a drop of \$11 million.

But the biggest dividend payment drop was reported by the automobile industry—a decrease of \$208 million from \$760.6 million in 1950 to only \$522.1 million in 1951.

No Appearance—Falling off in the final total became more evident in late 1951, when extra and special dividends failed to show up—despite continued increased

production by most of the industries except the automobile factories. Car production had been cut back and defense contracts failed to take up the slack.

Major reasons were obvious—rising materials and wage costs and increased tax rates, resulting in lower corporate profits.

"Although corporate profits before taxes reached an all-time high in 1951," the Council of Economic Advisers reported, "they were much lower in the second half than in the first half."

Tax Rake-Off—Council statistics showed corporate profits rate (before taxes) as increasing by \$3.4 billion in 1951 from the 1950 total of \$41.4 billion.

But, at the same time, according to Council tabulation, the corporate tax burden rose by \$8.1 billion to an estimated all-time high of \$26.7 billion.

Another reason for the slowdown in the dividend payments is the huge industrial expansion programs, which throw a drain on



Ask Coal Co-Op Approval

Government approval of cooperative anthracite exports is sought in Washington by the Anthracite Export Assn.

Federal Trade Commission says the association has filed papers under the Webb-Pomerene Act for export of anthracite by Pennsylvania producers and their affiliated wholesalers.

The act provides that nothing in the Sherman Antitrust act shall be construed as declaring illegal a cooperative or association entered into for the sole purpose of engaging in export trade, provided there be no restraint of trade within the U.S., restraint of the export trade of any domestic competitor, or any artificial or intentional enhancement or depression of prices within the U. S.

net earnings. Steel companies alone, according to industry reports, poured more than a billion dollars into its expansion program during 1951.

On the gain side of the ledger was the oil refining industry. It increased dividend disbursements over 1950 by \$152 million to a figure of \$943.1 million.

Increased dividends were also reported for railroads, communications, nonferrous metals, mining, and trade in general.

Government Guaranties Extended

Government guarantee of private industrial investments abroad has been expanded to include the Philippines.

Announcement last week by the Mutual Security Agency of the signing of such an agreement marks the first time such guarantees of private capital have been extended outside the European countries and dependencies included under the Marshall Plan.

As it now operates under the 1951 Mutual Security Act, two types of insurance are provided.

One guarantees the investor of the convertibility of percentages of profits into American currency. The other insures the private firm against loss through confiscation.

Industrial Briefs

Service Enlarged — DUCOMMUN METALS & SUPPLY CO., Los Angeles, has enlarged the sales staff of their office in the Atlas Building, Salt Lake City, to give more service to industrial firms in the Intermountain Market in Idaho, Utah, Wyoming, and Nevada. The sales office will act as a clearing house for handling of all orders and inquiries.

Cars Ordered—Two hundred triple hopper cars of 70-ton capacity, fabricated from high tensile, low alloy steel, have been ordered by CARBON COUNTY RAILWAY CO., Salt Lake City. They will be built by Greenville Steel Car Co., a subsidiary of Pittsburgh Forgings Co., at its plant in Greenville, Pa.

Special Boiler—A boiler has been ordered from BABCOCK & WILCOX CO., New York, to supply steam for Israel's first sugar refinery, expected to be in operation by fall of this year. The boiler, which is one of the new shop-assembled types, will have a special superheater and economizer designed to meet the temperature and pressure requirements of the refinery.

Slitter Solves Problem—Fabrication of steel products involving the use of steel plates and bars in a broad range of sizes, presents a serious inventory problem, which LEWIS WELDING & ENGINEERING CORP., Bedford, Ohio, claims to have solved with a special slitting machine. The slitter cuts stock plates up to 10 in. in width and 30 in. in length into strips without rehandling, and can simultaneously cut two parallel edges, which eliminates most of the warping associated with long torch cuts.

Gas-Turbine Locomotive — METROPOLITAN-VICKERS ELECTRICAL CO., LTD., Manchester, England, has delivered the first British-built gas-turbine locomotive to British Railways.

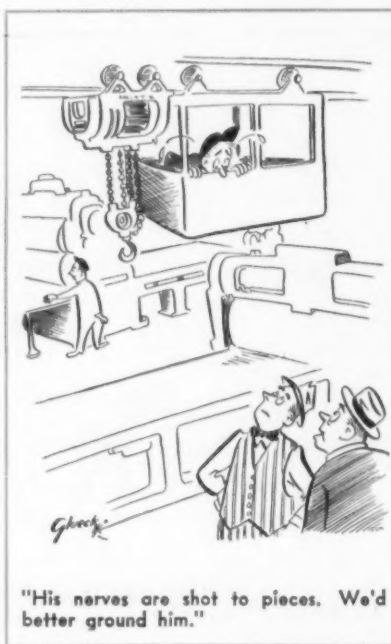
Annual Conference—The third Annual Welding Conference sponsored by the AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, Detroit Section of the American Welding Society, and the Industrial Electrical Engineers Society of Detroit, will be held in Detroit, Apr. 16, 17 and 18.

New Publication—"The Crucible Steelman," an eight-page newspaper, reporting activities of employees throughout the country, has been published by CRUCIBLE STEEL CO. OF AMERICA. Leading stories in the paper are devoted to the company's \$37 million national defense expansion program and to the sales outlook in field of special purpose steels.

Stock Acquired — ARWOOD PRECISION CASTING CORP., Brooklyn, has acquired the capital stock of the Metalmold Corp., Derby, Conn. Metalmold will be operated as a wholly-owned subsidiary in addition to the Arwood plants in Groton, Conn., Tilton, N. H., and Brooklyn.

Specialty Transformers—The Transformer Div., WESTINGHOUSE ELECTRIC CORP., Pittsburgh, will produce Hipersil wound cores for electronic transformers at two recently leased plants at Greenville, Pa., and Lima, Ohio.

Equipment Supplemented — MINE SAFETY APPLIANCES CO., Pittsburgh, is now handling a line of radiation detection instruments to supplement its equipment for protection of personnel and property in all industries. The instruments are manufactured by Beckman Instruments, Inc., and The Arnold O. Beckman Co.



"His nerves are shot to pieces. We'd better ground him."

Regional Seminar Meeting—In joint sponsorship with the National Industrial Distributors' Assn., the AMERICAN SUPPLY & MACHINERY MANUFACTURER'S ASSN., has planned a Sales Management Seminar to be held at 10 a. m. on Mar. 14 at the Palmer House, Chicago. The program has been planned for the purpose of better coordinating the combined efforts of manufacturers and distributors.

New Quarters—MICHIGAN CRANE & CONVEYOR CO., has moved to larger quarters at 115 McKinstry St., Detroit. The company has 22,000 sq ft of floor space and manufactures cranes, conveyors, furnace loaders and miscellaneous fabricated steel products.

Makes Purchase—The CLEVELAND GRAPHITE BRONZE CO. has purchased the Brush Development Co., Cleveland research and manufacturing firm in the electronics and technical instruments field.

New Degreasers—TOPPER EQUIPMENT CO., Matawan, N. J., successor to the former Optimus Equipment Co., will carry on the manufacture and sale of Circo Vapor Degreasers, by which trade name Topper equipment will be known.

Contract—LINK-BELT CO., Chicago, will design and build an iron ore handling and storage system for the Orinoco Mining Co., Puerto Ordaz, Venezuela. McDowell Co., S. A., Caracas, Venezuela, and Wellman Engineering Co., Cleveland, are associated with Link-Belt in this project.

Aircraft Research—A \$30 million aircraft-turbine research laboratory will be built at Lockland, Ohio, by GENERAL ELECTRIC CO. The lab, on a 5-acre plot, will consist of five reinforced concrete and steel frame buildings, plus service facilities. Project is to be financed entirely by GE.

Named Representative—ROBERT M. SLIFE & ASSOCIATES, INC., a new organization which succeeds Nook & O'Neill, Inc., was named Cleveland area sales and service representative for the Automatic Transportation Co., Chicago.

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The Automotive Assembly Line

Materials Crisis Almost Passed

Most grades of steel easy, but copper and aluminum stay tight . . . Demand for decontrol grows . . . Mill price cutting feared . . . Cast scrap market very soft—By W. G. Patton.

Except for copper and aluminum the material shortage period for the automobile industry has passed—temporarily at least.

Biggest problem today is trying to use up materials on hand. Steel sheets and strip in most sizes are relatively easy. Even alloy bars are coming into better supply. Some steel producers expect alloy steel supply will catch up with demand before the end of the second quarter. Several steel mills with large automotive orders have open space for May shipment but this may be the result of a lack of tickets—not a shortage of demand.

Want Decontrol — There is a good possibility the demand from Detroit for steel decontrols will increase. Both steel officials and automobile producers are known to feel that lifting restrictions on cold-rolled sheets, hot-rolled sheets, and certain wire products would have a stimulating effect on the economy—without hurting the defense effort. The steel industry's growing concern is that the third quarter will see price cutting in steel in order to keep mills booked to capacity.

During the past week there were strong indications that gray iron scrap might soon sell openly at Detroit at less-than-ceiling prices. Rejections of poorly graded scrap have already reached a point where the few foundries buying scrap may pick up the equivalent of \$50 in increased value per car. This is because of improved quality of the scrap they are getting. Scrap dealers are having little success in their effort to move the cast scrap they now have piled high in their yards but last week orders still went at ceilings.

Radiator Troubles — There are many things about changing automobile radiators that have escaped the public entirely—and some Washington officials as well. It is not generally known, for example, that redesign, due to changes in materials, may cause a drop in radiator performance of as much as 8 pct.

One firm investigating the use of copper-clad aluminum found that in rolling the copper and aluminum sandwich, the aluminum work-hardened. The hardened material cracked and tore in the press. If the material was annealed so it could be formed, the

bond between the copper and aluminum was destroyed. One firm has indicated the copper-aluminum sandwich was abandoned for this reason.

Auto Plate Sizes—The need for standardization is illustrated by the license plates you have on your car. *Automobile Facts*, published by the Automobile Manufacturers Assn., points out, for example, this year's auto plates issued in the 48 states and District of Columbia vary in length from 6¾ in. to 14 in. Height varies from 4¾ in. to 6½ in. Altogether there are 57 different sizes.

In manufacturing a car, mountings must be designed to allow for variation in bolt hole spacing. Car manufacturers are urging adoption of a standard license plate.

Defense No Help—There is additional evidence that automobile manufacturers see little possibility of picking up additional workers through defense.

In its annual report, Chrysler disclosed that employment has fallen from a peak of 127,600 in May to 97,600 in December. At the end of the year only 8200 Chrysler workers were employed on defense jobs.

Perhaps the most enlightening figure in the Chrysler annual report was this: in an aggregate dollar sales value of \$2,546,678,779, military business amounted to approximately \$76 million.

Increase—Truck-trailer production rose slightly in 1951, despite materials shortages and strict controls. But output for 1952 is now seen as falling below the 1950 total.

Census Bureau reports show that 1951 production amounted to 67,384 units, an increase of 3767 from the 64,617 reported for 1950.

On the basis of the materials allocation rate now projected for the first half, industry spokesmen have forecast 1952 output at around the 62,500 unit figure.



LOW BEAM: An automatic headlight dimming device, the "Autronic Eye," was displayed for the first time at the Oldsmobile exhibit at the Chicago automobile show last week. The device operates by a prismatic condensing lens. When the oncoming car reaches the distance where headlights should be dimmed, the eye reacts and depresses the headlight beam.

Bad Influence:

Un-American Committee holds hearings on Red influence in Detroit.

Detroit is the scene this week of hearings conducted by the House Un-American Activities Committee to determine the extent of Communist influence in the motor industry. As the hearings opened, some important witnesses were found to be missing.

Remembering how the Communists were able to hamstring attempts to oust them from office in Ford Local 600, Detroit observers are watching developments with reservations. There is no evidence the committee will get active support from either the Federal Bureau of Investigation or United Automobile Workers-CIO.

Among witnesses subpoenaed were Patrick F. Rice, a vice-president of Ford UAW-CIO Local 600 and William R. Hood, recording secretary of Local 600.

The unionists called so far do not include members previously tried as Communists by UAW-CIO groups.

Questions Raised—The investigating committee was expected to call a number of workers from Ford foundry, motor plant and press buildings where the Reds are reportedly strong. As the hearings got under way, several unanswered questions were presented: (1) What would happen if a witness refused to answer questions? (2) Would the Communies turn the hearings into another advertisement of the racial question? (3) To what extent would the auto plants be embarrassed by the testimony presented at the hearings?

High Prices Won't Hurt Car Sales

The price of 1952 cars is high. Many car owners consider today's car prices "out of sight." However, no responsible automobile sales official is willing to concede

the auto market will suffer seriously as a result of recent price increases.

Here is some supporting evidence for continued good business in the automobile industry: (1) Despite industrywide shutdowns for model changeovers, dealers' stocks were reduced by more than an estimated 25,000 units during December; (2) automakers are continually increasing the proportion of higher price cars; (3) in terms of actual purchasing power, automobile prices are not high; (4) the 40 pct cut in automobile production in 1951 has not been matched by a comparable reduction in payrolls; and (5) the price of a used car is relatively high, which narrows the dollar gap between the trade-in and the price of the new car.

According to auto officials, it took 1141 bushels of wheat to buy a car in 1940; today it takes only 827 bushels. In 1940 an average factory worker earned the price of a car in 31 weeks. Today the "work price" of a car is 28 weeks.

UAW Feasts GM Contract Birthday

Walter P. Reuther and a group of top union officials took time off recently to celebrate the fifteenth anniversary of the signing of the first General Motors-UAW contract. The rally at Flint was preceded by a 1000-guest dinner.

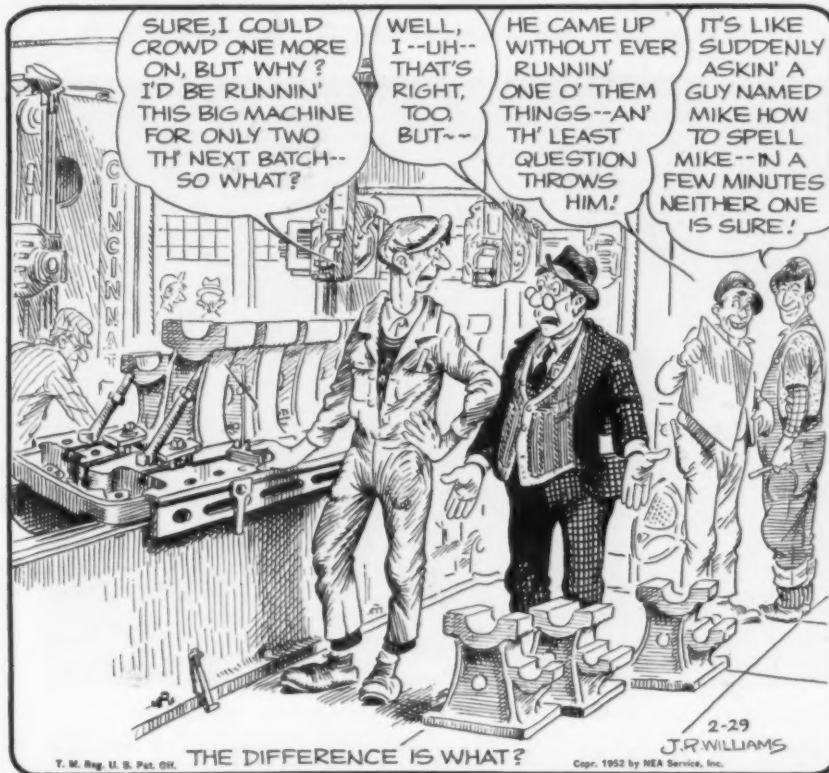
It will be recalled the first GM-UAW contract was signed after a 44-day sit-down strike. There were pitched battles in Flint between police and the strikers. The total of shootings and beatings reached 27. Automobiles were overturned and property damage ran high.

Lewis Absent—At the height of the trouble the late Frank Murphy, Governor of Michigan, interceded. Murphy finally worked out a settlement with John L. Lewis who was conspicuously missing from last week's gathering.

At the rally, Walter Reuther made it plain that the union has its eye set on a guaranteed annual wage and a \$200-per-month pension.

THE BULL OF THE WOODS

By J. R. Williams



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3. How about anhydrous, active ingredients? Am I actually paying freight and storage on water and fillers?
4. Will my present cleaner still give good results under such tough conditions as low temperature... heavy soil load in the tank... overlong periods between recharging? Or must I figure on rejects?
5. Will it tackle such difficult jobs as removal of heavy grease load... compounded and impacted soils... buffing compound... and still rinse free and clear?
6. Do I get the kind of qualified technical assistance from my supplier that I need to get the optimum results from cleaning?

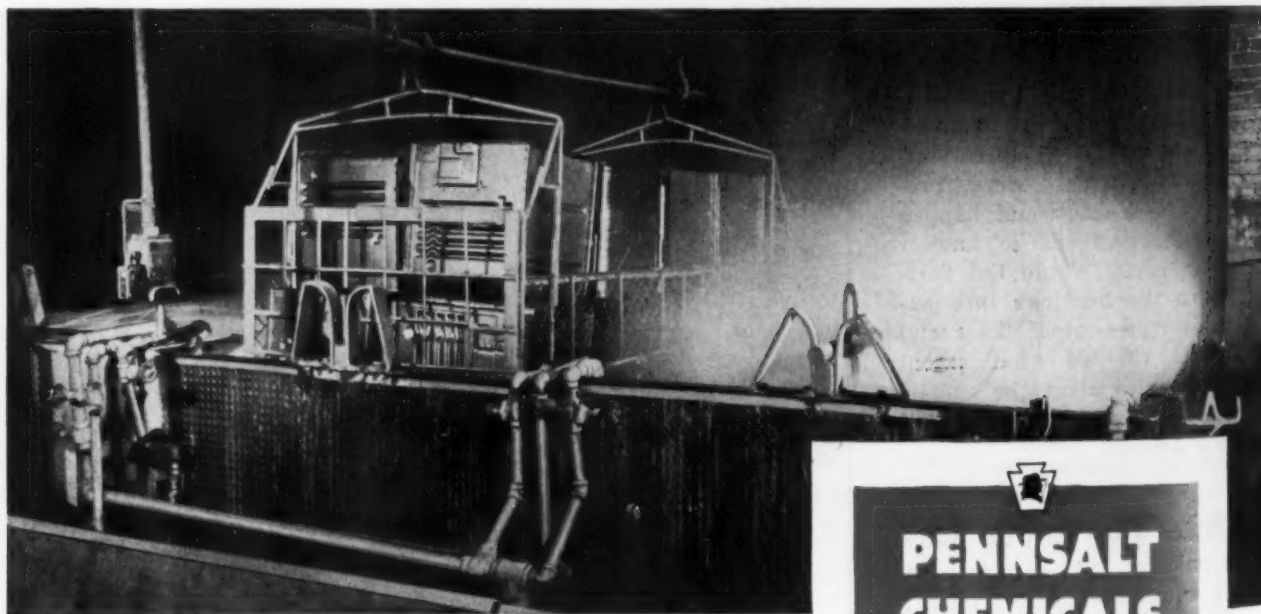


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West Coast Report

Tinplate Quotas May Hit Output

Tin allotments for new capacity only tentative . . . Heavy plate demand cuts hot-rolled sheet output . . . Western coke producing facilities inadequate . . . Ship ingots to England.

Increases in tinplate production on the West Coast scheduled for sometime in the latter part of the second quarter may be tempered by limitations on tin allotments.

Columbia-Geneva Div. of U. S. Steel at Pittsburg, Calif., is currently running heavier on electrolytic tinplate than on dipped and is making its tin allotments go as far as possible. Allocations of additional tin for its new doubled capacity scheduled for production in June are believed to be on a tentative basis.

Another factor which may reduce output of tinplate of both western producers is the heavy plate demand which is cutting into production of hot-rolled sheets.

If controls on end uses of tinplate are eased, as expected, there is no doubt that both West Coast producers will be in a seller's market. Tinplate consumption in the West and Hawaii in 1952 will be well over 800,000 tons and western production will probably not exceed 450,000 tons. In 1953 production may rise to 500,000 tons.

Coke Opportunity—Although no precise figures are available, there is an apparent dearth of coke-producing facilities in the West. Periodically foundries have been hard pressed for adequate and reliable supplies.

Only coke production facilities in the far West, other than in California, now operating are in Utah. These are the by-product ovens at Geneva and Ironton plants of Columbia-Geneva Steel Div., U. S. Steel, and some beehive ovens at Sunnyside.

Not Used—About 300 beehive

ovens at Columbia, Utah, have not been used since Geneva acquired the No. 2 blast furnace at Ironton.

Utah production in 1951 was 1,338,737 tons, of which 1,237,065 came from the Ironton and Geneva by-product ovens and 101,672 tons from the Sunnyside beehive ovens. The beehive coke is not used for steelmaking but is sold commercially to foundries and smelters.

West Coast supply is inadequate to meet demands. Coke must be shipped in from several states, mostly from two Colorado producers who are in the commercial coke business.

Progress Report—Seidelhuber Steel Rolling Mill at Seattle, the West's newest steel producer, has made its first shipment of ingots to England toward completion of a 10,000-ton order.

Frank Seidelhuber, Jr., is in the East this week to negotiate a contract for a 3000-ton-per-month order of stainless steel.

Scrap, initially believed to be a problem, has been coming in satisfactorily. Mr. Seidelhuber has quit

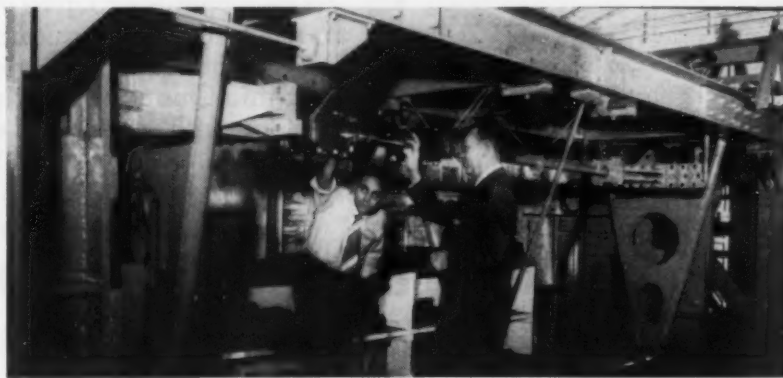
buying off-shore scrap and is expanding his yard.

Restrictions on the use of power in electric furnaces were lifted last week in Seattle which makes around-the-clock operation possible for Seidelhuber, Isaacson Iron Works, and Northwest Steel Rolling Mills. Seidelhuber, who has been operating only one turn, is going to two this week and a third may be added in a few weeks.

Round Trip—Iron ore mined in British Columbia and shipped to Japan returned to Victoria, B. C., last week in the form of 500 tons of steel plates. Measuring 5 x 20 ft, it will be used by shipyards.

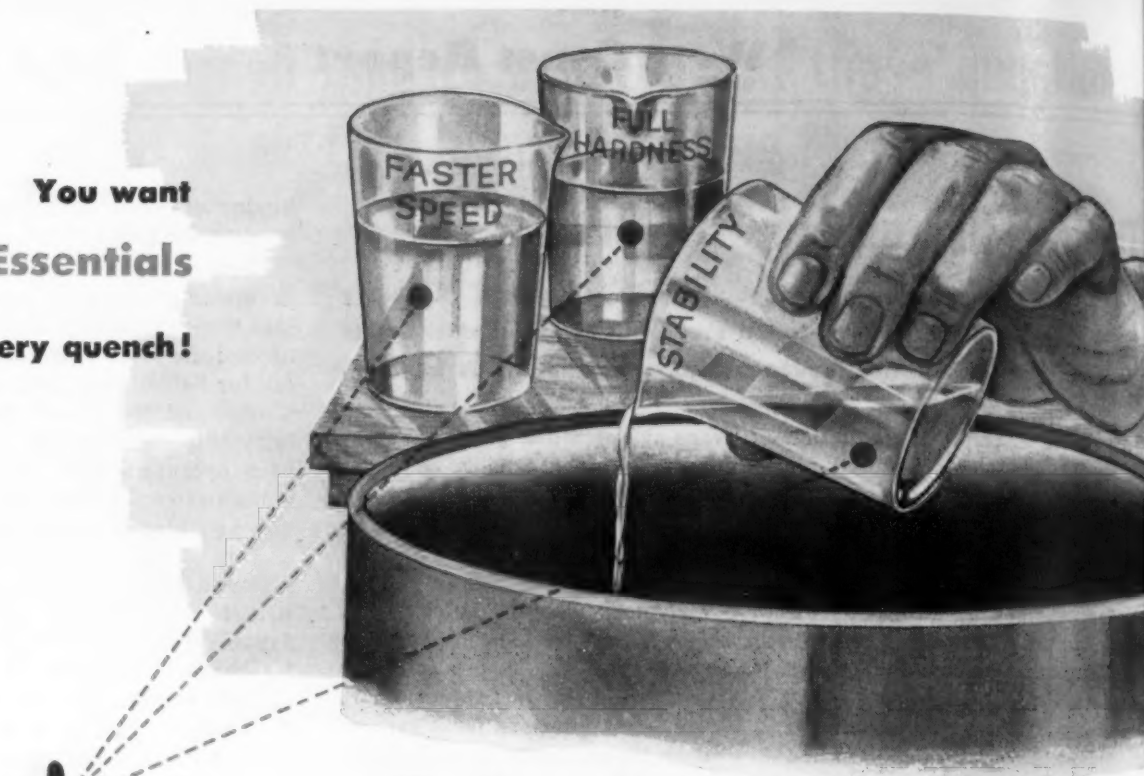
Price was not disclosed. It would be interesting to know the selling price of plates made from steel produced from iron ore which cost the Japanese approximately \$30 per ton at the blast furnace.

Happy Marriage—Establishment of the Geneva steel plant in Utah posed questions about its effect on the historical agrarian economy of the state. Last week Irving S. Olds, chairman of the board, U. S. Steel Corp., answered it by stating that although there are five times as many industrial workers in the area where the plant is located as there were 10 years ago, farm employment has increased 65 pct.



TESTING: This Lockheed Aircraft Corp. strength tester can develop 500,000 lb of force. Here company engineers H. W. Foster, right, designer of the device, and Jack Ryan, left, test a transport landing gear piston.

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Machine Tool High Spots

Toolmakers Leery of Stockpile Plan

NMTBA may go on record soon, issuing formal statement on Washington plan to store new tools . . . Industry fears U. S. domination and control through purchasing—By G. Elwers.

The proposed government stockpiling of new machine tools has machine tool industry leaders worried for several reasons. Though no definite plan yet has been proposed, it is probable that the National Machine Tool Builders' Assn. will feel it necessary to issue a formal statement on the subject soon.

This will be known after an NMTBA committee has a chance to talk things over with Clay Bedford, sponsor of the plan.

Actually, builders don't dislike the basic idea of a machine tool stockpile. In fact the NMTBA has a committee considering recommendations to Washington on the subject. But some of the ideas reportedly being kicked around in Washington now don't look so good.

Fear Domination — Primarily, the industry fears government domination. It looks now as if the government might invest \$2 to \$3 billion over a 4-year period in machine tools. That would make Washington far and away the biggest machine tool customer.

It would take more than half of the industry's output at today's high production levels. It would mean buying more tools each year than the entire industry produced in 1951.

Overdose of Control—That situation could lead to too much government control over machine tool builders. True, Washington today is behind most machine tool purchases. But the actual buyers for the most part are private industrial firms. Stockpiling on the other hand, would probably in-

volve direct purchases by a government agency.

The industry fears this might mean government meddling in design, development, product mix, and similar matters.

Continuing Buying—Even after major purchasing was done, keeping the stockpile up-to-date, if done well, would involve substantial purchases each year. These might amount to \$10 or \$15 million a year. This amount would still be a sizeable slice of machine tool output, enough to make the government cast a long shadow over machine tool builders.

It is reliably reported that while Clay Bedford and various military leaders favor the stockpile plan, Mobilization Boss C. E. Wilson isn't in back of it.

Another Way—Machine tool industry thinking on the stockpile idea runs more to building a stockpile of the tools now being ordered for the defense program. These

tools could be kept in the plants for which they are being ordered or put in storage if the plants are ever converted to other use.

Success of any stockpile plan would depend to a large extent on keeping the stock up-to-date. And on keeping it in good condition. The industry hopes that lessons learned from experience in stockpiling World War II machines will be applied.

These include storage only of machines which are in good condition and have all parts and spares available. And use of scientific preservation methods. And, no dumping of surplus tools on the market to compete with sales of new machine tools.

"Buy European"—A government report indicates that from now on most buying of machine tools by NATO countries will be done in Europe. Only in the case of special requirements will additional orders be placed here. In fact, the report says that new orders are not likely to match the cancellations that are being effected as European sources are being uncovered.

It is the definite aim of NATO planners, according to the report, to channel urgent NATO orders to European manufacturers with open capacity, and to cancel on American firms.

The report mentioned that extremely close surveillance is maintained over all machine tool licenses issued to firms in Western Germany, Switzerland, and Austria. The idea, of course, is to prevent transshipment or resale behind the Iron Curtain.

Sorry, Wrong Argument — In Michigan, labor leaders and politicians have protested the Fisher Body machine tool contract cancellation on grounds of unemployment in Detroit. Actually, no Detroit workers would have been employed on this job.



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The **Iron Age**

SALUTES

Admiral Ben Moreell

A farsighted "builder" has injected new spirit into America's fourth largest steel company.



WHEN he retired as president of Jones & Laughlin Steel Corp. last month Admiral Ben Moreell could look back on his first 5 years in the steel industry as a remarkable record of accomplishment. Though he continues as board chairman (a post he held along with the presidency since March 1947) he had already charted a new course for the nation's fourth largest steel producer.

During those 5 years the company's product emphasis has changed sharply. It has a new concept of community and employee relations.

The Admiral gets along well with unions—and not because he gives them all they want. The year before he took over, J & L had 36 wildcat strikes. In less than a year he had cut that to nine. He once fired a crew of strikers against the advice of some associates who predicted the whole plant would walk out. Instead the union thanked him for getting rid of the troublemakers.

When land was needed for a new \$70 million openhearth shop, he saw to it that the company—working with the union—found homes for the 296 families that had to be moved from the blighted area.

Ben Moreell came to J & L with a reputation as a builder—a reputation he earned as organizer of the "Seabees." He is, incidentally, the only non-Annapolis man to reach four star rank. His first major steel building project was a new high speed cold strip mill which put J & L squarely in the cold-rolled strip and tinplate business and switched the company's product emphasis into the fast-growing flat-rolled market.

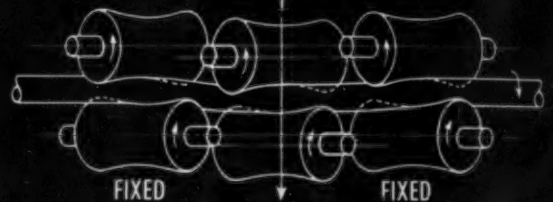
Pessimists who a few years ago shrugged off Pittsburgh as a declining steel center reckoned without at least one energetic administrator.

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The Mackintosh-Hemphill method of straightening is accomplished by an offset cross-roll pass between two fixed cross-roll passes (patented). No guides are required because the rolls are driven on both sides of the stock which is supported by the bottom rolls. With this balanced arrangement there is no decreasing efficiency from uneven wearing of the rolls. The straightening takes place from section to section and not from point to point.

These modern production tools straighten and finish cut-length material such as stainless instrument tubing, aluminum aerial stock, copper fuel lines, aviation brake tubing, standard welded pipe, heavy-wall seamless alloy tubes, large diameter wrought-iron pipe, and many other ferrous and non-ferrous tubular products *in sizes ranging from 1/16" O.D. to 15" O.D.*

Mack-Hemp Rotary Straighteners employ a six-roll arrangement, basic in all sizes, which

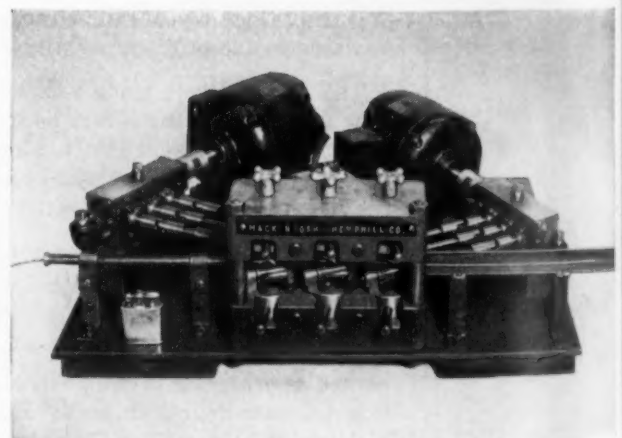
- STRAIGHTENS to precision tolerances, end-to-end
- FINISHES without leaving spiral scores, cuts, or rub marks on exterior surfaces
- REMOVES end bends from cut-length stock
- SPEEDS straightening and surface finishing operations

Mackintosh-Hemphill Rotary Straighteners employ a patented roll arrangement with an offset cross-roll pass between two fixed cross-roll passes.

This feature eliminates supporting guides for the material and increases the productive life of the rolls.

Send for bulletin S-7265 which describes in detail, the Mack-Hemp Rotary Straightener.

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The Iron Age

INTRODUCES

George K. Otis, elected a vice-president, LEAR, INC., Grand Rapids, Mich. He will continue as general manager of the LearCal Div., at Los Angeles.

Robert A. Huston, elected vice-president in charge of industrial relations, FULLER MFG. CO., Kalamazoo, Mich.

George D. Potter, formerly general sales manager, promoted to director of sales; and John M. Dunser, formerly assistant to the general sales manager, replaces Mr. Potter as general sales manager, Wolverine Tube Div., CALUMET & HECLA CONSOLIDATED COPPER CO., Detroit.

John T. Boon, appointed sales manager, Arms & Ammunition Div., OLIN INDUSTRIES, INC., New Haven, Conn.

Paul W. Rhame, appointed general manager, Rochester Products Div., GENERAL MOTORS CORP., Detroit. He succeeds Ralph B. Knight, who will be on special assignments until his retirement in June.

Herbert E. Fryer, named manager of sales, Denver district, Columbia-Geneva Steel Div., U. S. STEEL CO., San Francisco.

John W. Brigham, appointed general sales manager, BAKER BROTHERS, INC., Toledo; and John P. Nugent, appointed assistant sales manager.

A. Gilbert Formel, becomes projects manager, LOEWY CONSTRUCTION CO., INC., a subsidiary of Hydropress, Inc., New York.

A. J. Karol, appointed assistant vice-president, M. S. KAPLAN CO., Chicago.

Fletcher B. Taylor, formerly assistant purchasing director, named purchasing director, DIVERSEY CORP., Chicago.

D. G. Viskniskki, appointed Chicago district manager, DIAMOND CHAIN CO., INC., Indianapolis, to succeed S. C. Hurley, who has retired.

Clifford N. Barber, appointed manager, Oklahoma City district office, CECO STEEL PRODUCTS CORP., Chicago.

Frank Ingham, appointed Cleveland manager, ATLAS CHAIN & MFG. CO., Philadelphia.

Kenneth L. Matthews, former manager, estimating department, appointed district sales engineer, INGALLS IRON WORKS CO., Birmingham. Mr. Matthews will have headquarters in Chicago.

Helmuth G. Braendel, appointed director of engineering and production, WILKENING MFG. CO., Philadelphia. Harry O. Moffett, appointed assistant to Mr. Braendel; and William J. Miller, appointed production manager.

Dr. J. H. Moses, appointed chief geologist, REYNOLDS MINING CORP., a subsidiary of Reynolds Metals Co., Louisville. Dr. Moses succeeds the late Dr. Carl Schmedeman.

Eugene D. Emigh, Jr., appointed purchasing agent, AMERICAN HARDWARE CORP., New Britain, Conn. He succeeds Joseph C. Andrews, who has retired.

Thur Schmidt, appointed director of research and development, Ingersoll Products Div., BORG-WARNER CORP., Chicago.



JOSEPH A. GRAZIER, elected executive vice-president, American Radiator & Standard Sanitary Corp., Pittsburgh. He was also named to the board of directors and its executive committee.



ROBERT M. McCABE, elected vice-president in charge of purchasing, Vickers, Inc., Detroit.



EDWARD J. HELM, promoted to manager, Patent & Development Section, Engineering & Construction Div., Koppers Co., Inc., Pittsburgh.

Personnel

Continued

J. J. O'Brien, appointed assistant manager, AiResearch Aviation Service Co., a division of the GARRETT CORP., Los Angeles.

Dan J. Carroll, appointed manager, Residential Products Div., DETROIT STEEL PRODUCTS CO., Detroit.

Michael C. Turkish, appointed chief engineer, Coil Spring Dept., EATON MFG. CO., Detroit.

L. F. Manneschildt, appointed manager, factory branch, TRAIL-MOBILE, INC., Philadelphia.

Gene Artinger, appointed sales representative, southern territory and Central Pennsylvania, KEYSTONE DRAWN STEEL CO., Spring City, Pa.

Angus M. Brown, appointed manager of commercial sales, LAMSON CORP., Syracuse, N. Y.

Marvin L. Nelson, appointed works manager, new Wakonda Works, Des Moines, Iowa, SOLAR AIRCRAFT CO., San Diego.

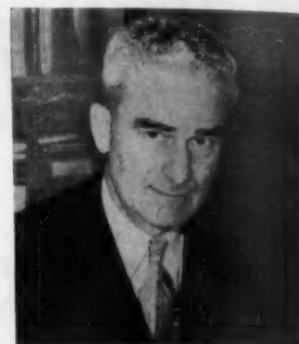
Gordon Kimball, appointed representative and tool engineer, New England area, KENNAMETAL, INC., Latrobe, Pa.

Charles L. Whittaker, appointed assistant district manager, Birmingham, INTERNATIONAL HARVESTER CO.

Harold F. Muth, becomes sales representative, New York branch sales office, NATIONAL RADIATOR CO., Johnstown, Pa.

Charles H. Wirth, appointed engineering representative, AUDIO & VIDEO PRODUCTS CORP., New York.

Thomas L. Blose, joins A. O. SMITH CORP., Texas, as chief engineer, Houston pipe mill.



J. R. STEELMAN, elected president, Koehring Co., Milwaukee. He succeeds G. E. Long, who remains as chairman of the board.



E. A. BRUGGER, elected vice-president and general manager, Koehring Co., Milwaukee.



FOSTER W. LAMB, appointed general sales manager, Automatic Transportation Co., Chicago.



DEAN B. SKILLIN appointed to the sales staff, Continental Screw Co., New Bedford, Mass.

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Experimental furnace RECOVERS MANGANESE FROM SLAG



By R. C. Buehl

Chief, pyrometallurgy
Central Experiment Station
U. S. Bureau of Mines
Pittsburgh

From slag containing from 2.5 to 11.5 pct manganese, about 6 out of every 10 lb of this critical steel ingredient was recovered. The resulting iron-manganese metal, 56-63 pct Mn, is suitable for production of ferromanganese. Iron yield may offset much of process' cost so that it could compete with foreign ores. High-phos metal is also produced.

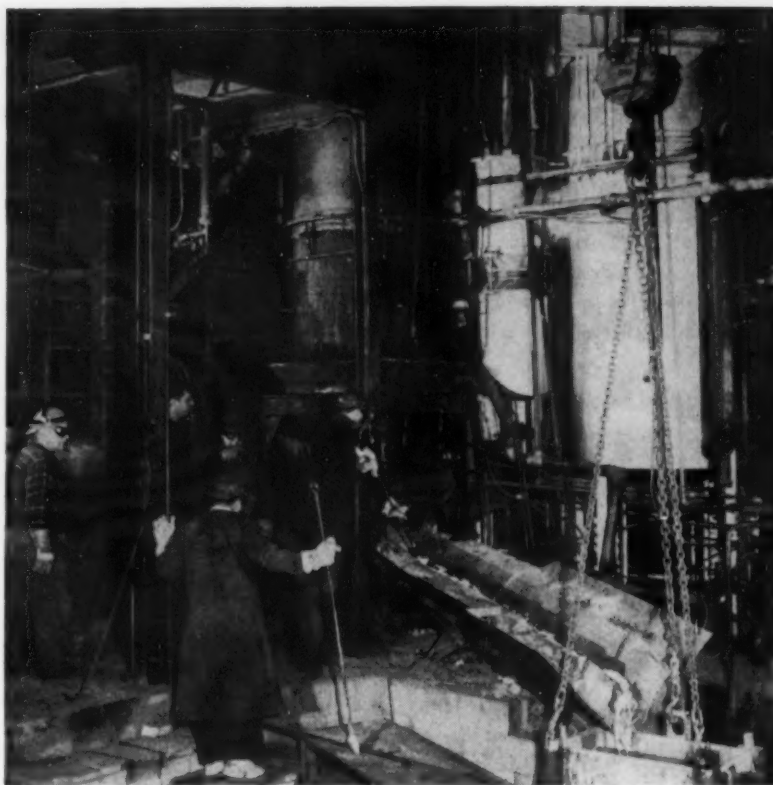
An iron-manganese mixture containing 12 to 24 pct Mn is being recovered from open-hearth slags. The process used was developed by the Bureau of Mines at the Central Experiment Station, Pittsburgh, Pa. Because of the extreme importance of manganese, the work is aided by the steel industry through the American Iron & Steel Institute.

Blowing of the metal resulting from the new technique in a basic-lined converter produces a high-manganese slag. It contains about 60 pct Mn. This constitutes a synthetic ore for the production of ferromanganese.

An experimental blast furnace blown in during May, 1951, was built to study the feasibility of salvaging some of the approximately 700,000 tons of manganese discarded in slag each year. It was believed that this nation's dependence upon imports of manganese ores might thereby be lessened. At the outset, the furnace was extremely difficult to operate; many problems were encountered and overcome. Today the experimental furnace functions for periods of about 2 weeks without shutdown. In initial tests, the furnace was blown in similarly to a commercial unit, with a light burden, low wind and low blast temperature. The hearth remained cold for many hours and was difficult to flush or tap.

From the lessons learned, a new procedure was developed. With the new method, scrap is charged during the blow-in. This is done in a manner similar to a cupola at a blast of 600 cu ft per min and a metal coke ratio of 1:6. The large flow of molten metal into the hearth heats it rapidly and the furnace can be tapped easily. Another early difficulty was a tendency for slag to freeze just below the tuyere level. When the tapping hole was opened, all the metal would not drain nor would gas blow from the tapping hole. Flushes of slag always contained metal, even though the hearth was not full of metal.

The heat input per unit of slag smelted was raised by increasing the coke ratio to 9000 lb per net ton of product. Blast temperature was increased to 2000°F and enriched to 26 pct oxygen. These changes failed to correct the difficulty. The final solution was provided by changes in furnace design. The bosh diameter was enlarged at the tuyere level. The hearth was raised slightly by decreasing the height of the water-cooled bosh a corresponding amount. The tuyere opening was altered. The furnace is 22 ft high and is housed in a laboratory building. The original furnace diameter at the tuyere was only 19 in. inside the brick, but later had to be enlarged to 26 in. The inside diameter of the lined stack is 32 in. The



METAL CAST being made from experimental blast furnace Central Experiment Station, Pittsburgh. The furnace is the dark cylinder in the center of the illustration. It was first blown in last May. (Photo courtesy U. S. Bureau of Mines.)

Manganese from slag (continued)

bosh is 34 in. high. Height of the stack from the top of the bosh to the charge line is 8 ft.

The hearth shell has a 50-in. diam and a 36-in. height. Both rammed plastic fire clay and fire-clay brick lining have been satisfactory. After several days of operation, the lining is eroded to about a 30-in. diam and a depth of about 20 in. below the tuyere. It remains quite constant thereafter. The hearth is removable, making it easy to inspect and reline.

Refractory-lined pebble stoves used

Two steel pebble stoves lined with refractory are used. They are 11-ft high and have a 52-in. diam. A lining of high-quality mullite brick is backed with 7 in. of insulating brick. The stoves are filled with alumina spheres about 1-in. diam to a depth of 6 ft. These spheres serve as a heat-exchange medium. Heating is accomplished by natural gas fired downward from burners at the top. The temperature of the stoves, which are limited to about 3100°F, is controlled by setting the ratio of gas to combustion air. As in normal blast-furnace practice, the stoves are alternately heated and blown. Reversal of the stoves is automatic; air-operated valves function on a timed cycle.

The approximately 2600°F temp of the hot blast leaving the stoves varies less than 140°F during a ½-hr blowing period. By mixing cold air with hot blast from the stoves, the tempera-

ture of the blast to the furnace is regulated to any desired value up to 2400°F. Automatic control of the cold air maintains the blast temperature constant to within 20°F.

One water-cooled copper tuyere is employed to reduce heat losses to a minimum. A single tuyere is satisfactory when its opening is the proper size and shape for the quantity of air blown. A 3½-in. opening was used at the outset, but there was a definite channeling of the gas to the side above the tuyere. When a 2-in. opening was substituted, a hot spot developed on the bosh opposite the tuyere.

An elliptical shape has proved satisfactory. It has a 2x3½-in. opening and is angled downward at 6°. The optimum blowing rate is 450 cu ft per min with this tuyere.

There is a direct relationship between the quality of the open-hearth slag fed the experimental furnace and the analysis of the resulting metal. In some runs, a flush slag with the relatively high manganese content of 11.5 pct was used. This came from the Homestead Works of the U. S. Steel Co. It resulted in a metal containing 21 to 24 pct Mn, 3.2 to 4.5 pct C, 0.8 to 4 pct Si, 3.5 to 4 pct P. The remainder was mostly iron.

A normal mixture of tap and flush slag was obtained without special segregation or handling from the Duquesne Works of U. S. Steel Co. The resulting metal contained 16 pct Mn. Such slag, which is entirely self-fluxing, analyzed at about 7 pct Mn.

In producing a 22 pct Mn metal with the experimental furnace, coke consumption was 3700 to 4000 lb per net ton of tapped metal (spiegel) when the blast temperature was 2050°F. With a blast temperature of 1900°F, more coke was consumed, about 4400 lb per 2000 lb of spiegel.

These temperatures are high when compared with commercial blast furnaces, which normally range from 1000° to 1600°F. It must be remembered that heat losses in a small experimental furnace are proportionately high. The loss can be most readily compensated for by increasing the blast temperature.

In a daily production of 3 tons of spiegel, 6½ tons of slag are drawn from the experimental furnace. Slag is flushed every 1 to 1¼ hr. Metal casts are usually made at 3½-hr intervals, or one to every three slag flushes. During most of the tests, the manganese content of the slag has ranged from 2.5 to 3.5 pct when the furnace produced a spiegel of 21 to 23 pct Mn metal. This results in a loss of manganese to the blast-furnace slag of 20 to 25 pct of the amount charged.

The manganese recovered in the metal was quite variable, averaging around 60 pct of the manganese contained in the open-hearth slag charged. However, with longer operations and recovery of the manganese lost in the flue dust, it should be possible to increase the manganese yield by perhaps 10 to 15 pct.

The second step of the process consists of blowing the metal from the blast furnace in a basic-lined converter. This produces a high-manganese slag that would be used as a synthetic metallurgical grade ore.

A side-blown basic-lined converter capable of holding 600 lb of metal was therefore constructed. Tests were run with this converter during the period that the blast furnace was being erected. Slags have been produced containing 56 to 63 pct Mn, 2 to 6 pct Fe, 5 to 20 pct SiO₂, 3 pct Al₂O₃, and 0.01 to 0.3 pct P.

The major problem is the control of the phosphorus content of the slags. A special blowing procedure had to be devised to obtain slags of satisfactory low phosphorus content. The rate of blowing and length of blowing period must be carefully regulated to selectively oxidize manganese and leave the iron and phosphorus as metal.

Four to six tons of high-phosphorus metal are produced per ton of manganese in the converter slag. This metal, at present prices, is worth several times the high-manganese slag. Such metal probably would be given a further blow in a basic converter. Additions of lime would be made to remove phosphorus following European practice. It is hoped that the iron produced would defray much of the cost of the process. In that case, the high-manganese slag obtained would be competitive with foreign ores.

NEW BOOKS

"Manufacturing Processes, Third Edition," by Myron L. Begeman. This revised text on modern manufacturing processes, designed for professionals and students, brings the wide variety of process data up to date. Chapters on special casting methods, welding and allied processes, cold-forming of metals and plastic molding have been completely rewritten. Other new developments included are continuous casting of metals, Marforming, hydronamic forming, and cold and stud welding. First half of the book is devoted to foundry practice, pattern work and powder metallurgy. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. \$6.00. 600 p.

"The Engineer's Illustrated Thesaurus," by Herbert Herkimer. Over 800 illustrations of machine elements and assembled machinery are pictured. Included are details on fasteners, supports and structures, basic mechanical movements, materials handling equipment, transmission of liquids and gases, industrial processes, electrical appliances and refrigeration. Chemical Publishing Co., 212 Fifth Ave., New York 10, N. Y. \$6.00. 572 p.

"Methods of Measuring Humidity and Testing Hygrometers," by Arnold Wexler and W. G. Brombacher, of the National Bureau of Standards. Methods for measuring water-vapor content of air and other gases and for producing and controlling atmospheres of known humidity for hygrometer testing and calibration and for general research are reviewed. Government Printing Office, Washington 25, D.C. \$0.15. 18 p.

"1952 Directory of Federal Purchasing Agents." How to go about selling to the government is made easier with this book. Departments, the products they buy, locations and personnel are listed and indexed for easy reference. The Statesman Press, National Press Bldg., Washington 4, D. C. \$3.00. 112 p.

"Production Control," by Paul D. O'Donnell. From production forecasting to cost control the author considers the many production control problems facing management. Among the subject titles are: Materials handling, scheduling, expediting, statistical quality control, and product development. Prentice-Hall, Inc., 70 Fifth Ave., New York 17, N. Y. \$6.35. 304 p.

MANUFACTURE

and

USE OF GRAPHITIC TOOL STEELS

Show vast progress



By A. F. Sprankle

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Part I

Tool steels are notoriously difficult to machine. In many cases the industry has been forced to grinding, casting to size or to new methods of machining such as the electro-mechanical processes. The machinability of Graphitic Tool Steels containing about 0.40 pct free graphite is, however, much superior to that of comparable tool steels. Best machinability of these steels is in the spheroidized condition at a hardness range of 197 to 229 Bhn. Rigid control in graphitic tool steel making fixes the proper graphite content.

The two major considerations involved in the selection of any tool steel are ease of processing or fabrication and ultimate service performance. Although a hasty review might indicate any number of tool steels would meet these two major requisites, more careful study usually shows that a tool steel which appears excellent in one respect is quite often deficient in the other. It is generally conceded that increasing the amount of carbide forming elements tends to improve wear resistance and service life of tool steels on many applications, however such increase in carbide content normally decreases machinability and other desirable processing features, like grindability. Conversely, increasing the amount of sulphur in steel to improve machinability may deleteriously affect homogeneity and internal quality.

The graphitic tool steels are singularly different in that the graphite present improves machinability without impairment of other desirable qualities. Production and laboratory data

show that the presence of graphite in controlled amounts improves performance of tools and parts in service. The exact mechanism of how this improvement occurs is not completely understood but is probably associated with the anti-galling characteristics imparted to iron and steel by graphite.¹

Precise control of graphite in graphitic tool steels is important if good machinability and heat treatment response is to be maintained. For that reason care must be used in the selection of raw materials for melting. Equally good control must also be exercised in the melting and processing practices. Finally, as a check on all operations, metallographic control of the finished bar product must be used to insure the steel's conformance to predetermined machinability and heat treatment standards. For that purpose the graphite distribution chart shown as Fig. 1 was devised. The graphite control limits for the several different types of the graphitic tool steels together with their

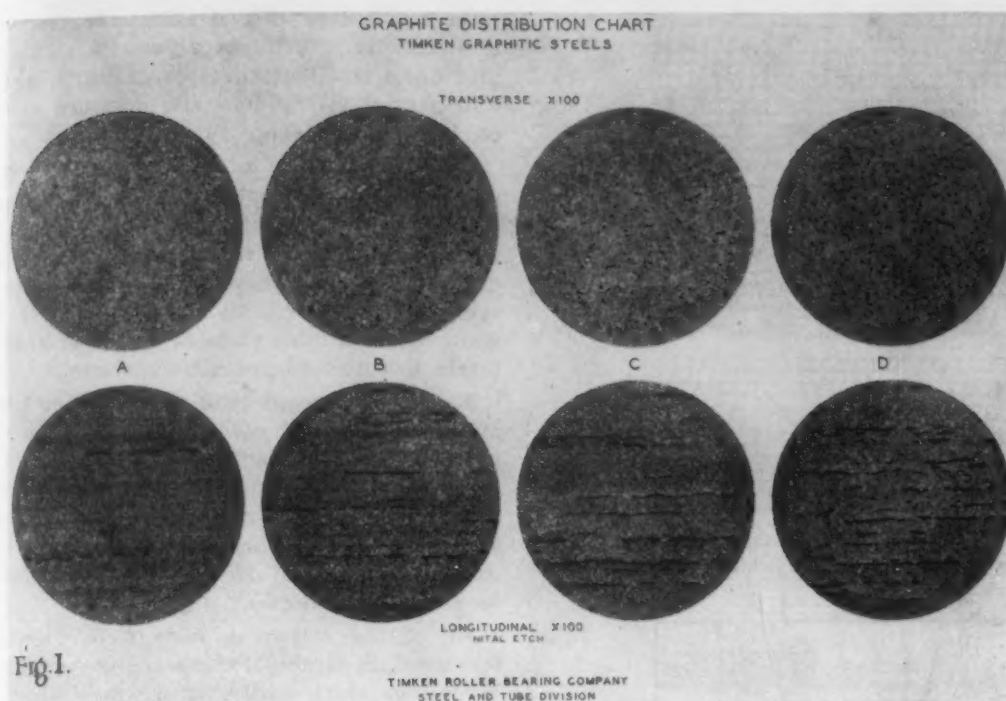


TABLE I

CHEMISTRY AND GRAPHITE CONTROL LIMITS

	C	Mn	P	S	Si	Cr	Ni	Mo	W	Al	Graphite Control Limits
Graph-Mo (Low Mn)	1.25 to 1.55	0.35 to 0.60	0.025 Max.	0.025 Max.	0.90 to 1.10	0.25 Max.	0.25 Max.	0.20 to 0.30	.....	.....	A/D
Graph-Mo (High Mn)	1.35 to 1.55	0.75 to 1.00	0.025 Max.	0.025 Max.	0.85 to 1.20	0.25 Max.	0.25 Max.	0.20 to 0.30	.....	.....	A/D
Graph-Tung	1.45 to 1.60	0.35 to 0.50	0.025 Max.	0.025 Max.	0.55 to 0.85	0.25 Max.	0.25 Max.	0.40 to 0.60	2.50 to 3.25	.....	A/C
Graph-Al	1.45 to 1.60	0.20 to 0.40	0.025 Max.	0.025 Max.	0.15 to 0.30	0.25 Max.	0.25 Max.	.....	.....	0.10 to 0.20	A/B
Graph-MNS	1.45 to 1.60	1.00 to 1.40	0.025 Max.	0.025 Max.	0.90 to 1.30	0.40 to 0.60	1.65 to 2.00	0.40 to 0.60	.....	.....	B/D

respective chemistry ranges are shown in Table I. It is readily apparent from the photomicrographs that the graphite tends to elongate in the direction of rolling or forging. This accounts for the very minute streaks and characteristic gray appearance on the surface of a freshly machined bar of graphitic steel as shown in Fig. 2. Although it might appear from the photograph that the 1.00 pct C bar has a much smoother machined surface finish than the Graph-Mo bar, such is not the case. Surface smoothness measurements using a brush analyzer on these bars when machined under identical laboratory test conditions are shown in Fig. 3.

For all practical purposes these recordings indicate a comparable degree of finish machined surface smoothness between the top half of the Graph-Mo bar and the full length of the 1.00 pct C bar all of which were given regular finish machine cuts. The bottom half of the Graph-Mo bar represents a rough machined surface cut.

Graphitic steels are fully spheroidized an-

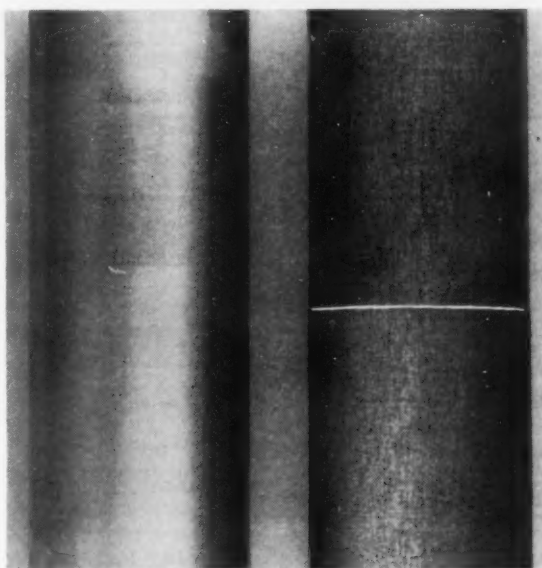


FIG. 2—Surface comparison of freshly machined regular 1.00 C tool steel bar, left, and Graph-Mo at the right. The top half of Graph-Mo bar was smooth machined. Regular steel is J.I.C. W-10 a water hardening grade, J.I.C. 0-6 is oil hardening Graph-Mo steel.

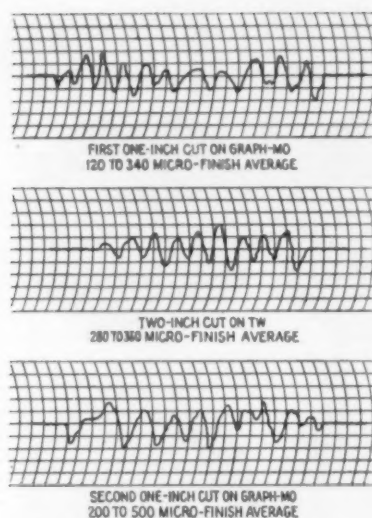


FIG. 3—Brush analyzer reading on finish machine cuts of plain carbon 1.00 pct C and Graph-Mo steels.

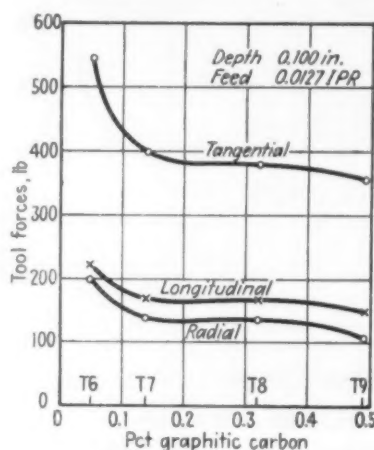


FIG. 4—Effect of graphite carbon content on lathe tool forces are shown above.

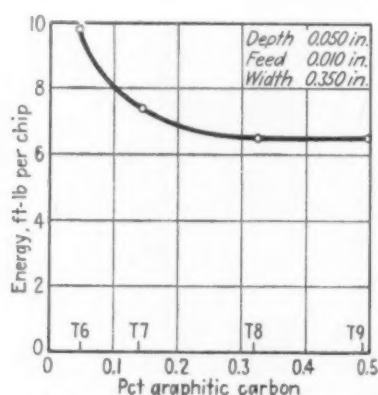


FIG. 5—Effect of graphitic carbon content on milling energy are shown on above curve.

Graphitic tool steels (continued)

nealed for best machinability. Many tests have been conducted both in the laboratory and in actual production machine shops to study the effect of graphite content on machinability. A specially equipped Monarch lathe was used to study the effect of graphitic carbon content on

lathe tool forces. Fig. 4 shows the results of this test. It is believed especially significant that quite small amounts of graphite, around 0.15 pct, greatly reduce the pressure exerted on lathe tools during turning.

Likewise, a study of milling energy versus graphitic carbon content was made using a pendulum type milling dynamometer. The graph, Fig. 5, shows that a decrease in milling energy occurs as the amount of graphite increases. As previously cited, the most pronounced effect takes place at the lower graphite levels, 0.05 to 0.20 graphitic carbon.

The effect of graphitization on drilling torque and thrust was studied using a Barnes drill press with torque and thrust dynamometer attachments. The curve plotted as Fig. 6 shows graphitic carbon content versus torque and thrust loading. Torque and thrust loads exerted during drilling are decreased quite uniformly as graphite increases.

All of the foregoing tests were conducted on essentially Graph-Mo base analyses except the highest graphitic carbon steel which was lower in molybdenum content. All steels were in a spheroidized condition within a range of 197 to 212 Bhn.

Excellent machinability due to graphite

Comparative machinability ratings were also made by using a Monarch constant-pressure experimental lathe. In using this equipment the fixed feed normally used in standard lathe turning is removed and in its place a constant load is applied by means of a pulley-weight arrangement. This equipment is completely described in an article by F. W. Boulger, et al.² The chemistry, structure, and hardness of the different steels tested are shown as Table II, while the machinability test results obtained are shown in Table III. The J.I.C. designations refer to the Joint Industry Committee on Tool Steels comprised of principal users and producers of tool steels.

In this type of test a 5 pct change in the machinability index has been found to denote a significant difference. Therefore, the wide spread in the machinability indices would constitute quite important differences in the machinability response of the steels tested. Since the hardnesses and structures of all these high

TABLE II

STEEL USED FOR MACHINABILITY TESTS

Tool Steel Type	Chemistry	Microstructure	Brinell Hardness
J1C-01.....	0.91 C, 1.10 Mn, 0.56 Cr, 0.18 V, 0.41 W.....	Spheroidized	197
J1C-02.....	0.88 C, 1.72 Mn, 0.07 V.....	Spheroidized with slight lamellar	197
J1C-06.....	1.51 C, 0.40 Mn, 0.26 Mo.....	Spheroidized	217

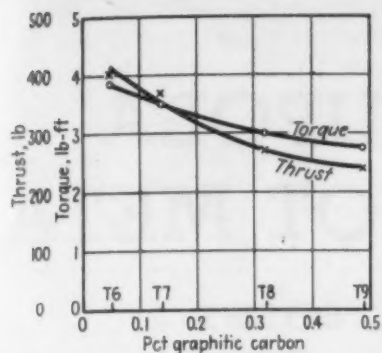


FIG. 6—Effect of graphitic carbon content on drilling torque and thrust shown graphically.

TABLE III
MACHINABILITY RESULTS FOR TOOL AND ALLOY STEEL BARS

Grade	Average "R"	Standard** Deviation	Coefficient of Variation, pct	Machinability Rating
J1C-01 0.90 C, 1.20 Mn, 0.50 Cr, 0.50 W	319	29.4	9.2	10
J1C-02 0.90 C, 1.60 Mn	109	2.9	2.6	30
J1C-06 (Graph-Mo)	63.8	4.8	7.6	62
Standard B-1112	33.2	2.9	8.8	100

* Average "R" indicates number of spindle revolutions which occurred during 0.1 in. tool travel.

** Standard deviation and coefficient of variation are statistics used to indicate scatter among observations.

Speed on standard: 86 a.f.p.m. (7/8 in. rounds)

Speed on unknown: 89 a.f.p.m. (1 1/2 in. rounds)

carbon tool steel types are quite similar, the marked improvement in machinability of Graph-Mo is due to the finely dispersed graphite particles. This is understandable because the actual nodular graphite count at 100 magnifications averages over 500,000 graphite particles per square inch of area.

Jominy hardenability has been used to show characteristic hardenability curves for the different types of graphitic tool steels, Fig. 7. These curves show the depth-hardening effect imparted to these steels as a result of their chemical composition, heat treatment and structural grain size. It is indicated by these curves that Graph-Tung and Graph-Al are water hardening types, Graph-Mo oil hardening and Graph-MNS air hardening.

The complete hardenability band for low and high manganese type Graph-Mo is shown as Fig. 8. The low manganese type is applied on bar sizes up to 3 in. in thickness whereas the high manganese type is used on all larger sizes. These Jominy values correlate quite well with results obtained on oil quenching full section round bars from which the depth-hardness penetration curves of Fig. 9 were constructed.

Graduated hardenability control of Graph-Mo, dependent on bar size, takes advantage of the generally accepted theory of compressive

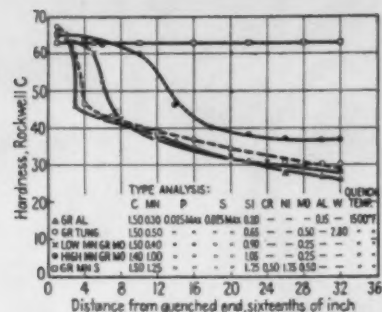


FIG. 7—Jominy Hardenability curves for Graphite Tool Steels made by Timken Roller Bearing Co.

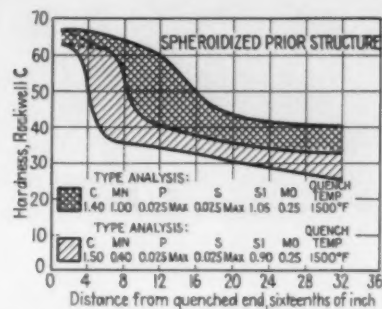


FIG. 8—Hardenability bands for high and low manganese grades of Graph-Mo tool steels.

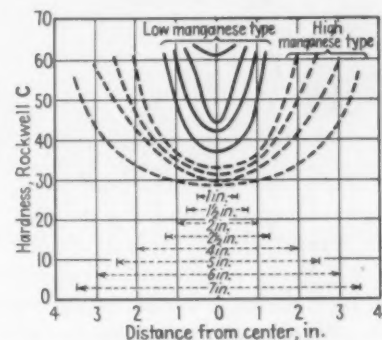


FIG. 9—Transverse hardness curves across the diameter of quenched round bars tempered at 300°F. of Graph-Mo.

stresses induced at the surface of a part that is not through hardened. The presence of such compressive stresses at the surface of a heat treated part has been shown to be conducive to improved service performance.³ Another factor of importance in such graduated hardenability control is that the hazard of quench cracking is decreased in intricate parts of critical size that so often are troublesome to the tool hardener.

Many production tests have been conducted to compare properties and performance of graphitic tool steels with conventional types.^{4, 6, 6, 7} Aside from production tests, a recent laboratory test was conducted to study the anti-galling characteristics of graphitic steel.¹

Part II will appear March 13th.



HOLDING FURNACE taps into the ladle in which the soda-ash treatment for sulfur removal takes place.

CUPOLA HOT METAL increases steel production, cuts ingot costs



By D. I. Brown
Technical Editor

Openhearth steel production has been increased 25 pct as a result of hot metal use in what had previously been a cold metal shop. The cupolas are averaging 20 net tons per hr of iron which is desulfurized with soda ash prior to charging into the steel furnaces. Hot metal costs are but \$3.74 per ton over the cost of the pig iron formerly used.

Non-integrated steel producers making openhearth steel from a 100 pct scrap charge have always suffered in times of scrap shortage. Even when good scrap is available the problems of suitable charge material in such shops are ever present.

To alleviate these conditions some of the smaller steel makers, who cannot afford or who cannot use the large tonnage of a standard blast furnace as a source of hot metal, have installed cupolas.¹ Cupola hot metal has paid off in these shops through increased steel production, lower openhearth fuel costs, less bottom trouble and more consistent steel meltdown analysis.

The Central Iron and Steel Div., Barium Corp., tapped their first cupola heat Dec. 30, 1947. Although the initial installation served the purpose of supplying hot metal, several years of operation experience with the first cupolas indicated that many changes could be made to improve the operation.² The first cupolas were shut down and changes made in design and general shop layout. Additional new equipment was also added to improve metal handling. The new installation was started up on Nov. 12, 1951, and has been melting continuously since then.

At Harrisburg the conversion cost of scrap to hot metal has been reduced to a near mini-

mum under present-day conditions. Based on ceiling prices for pig iron, steel scrap, cast iron scrap, and when using the optimum charging mix, hot metal on the average costs \$3.74 per net ton over cold pig iron delivered to the open-

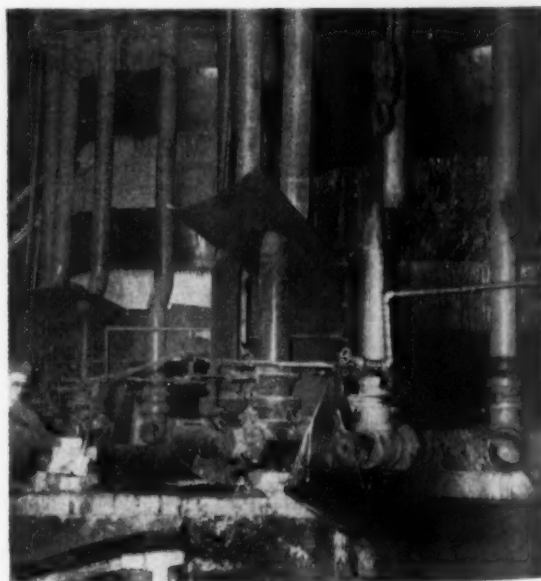


FIG. 1—Close up of the cupola shows the water cooled bosh splash plates and the general tuyere arrangement.

hearths. This comparison includes all labor and materials used in both the old cold charge and the new hot metal steel making practice. It also includes all freight involved with all figures reduced to net ton equivalents of those materials sold on a gross ton basis. This additional cost is further reduced by lower open-hearth steel making costs and greater production.

Although the cupola hot metal practice has been eminently successful at Central and elsewhere, no one believes this method to be superior to blast furnace operations when such equipment can be economically tied in to the steel melting operation. The cupolas at Harrisburg have proved so helpful to better and bigger steel ingot production that a similar system is being considered for steel operations Phoenix Iron and Steel Co., another subsidiary of Barium Corp.

Three cupolas in operation

Central Iron and Steel has constructed three, 108 in. diam. cupolas built side by side at one end of the open hearth pouring floor. Air is supplied to each cupola by individual blowers. These three centrifugal blowers are driven by 350 hp AC electric motors capable of supplying a maximum of 12,000 cu ft of air per min. Average blowing pressure is about 18 oz psi on these cupolas. The air is delivered to the wind box in a conventional manner but from the wind box the air is distributed down through 6 in. diam pipes to the 16 tuyeres, shown in Fig. 1.

Each cupola is identical in construction. A water shower cooled bosh is employed with the first of three water rings installed at the bottom of the wind box. The location of these water spray pipes is shown in the drawing. The water runs down the shell to a collector pan at the cupola bottom and is then run off into the slag runner. The cupolas operate continuously until the fire clay acid block lining is worn out. Generally only one cupola operates although two are sometimes run simultaneously when one of the cupolas is nearing the end of its run.

The average length of run for a single cupola is 72 hr actual melting time. The longest run at Central has been 89 hr. Each furnace is capable of averaging 15 tons per hr. It is believed that the cupolas will soon be tapping closer to 20 tons per hr as more experience in charging and operation is gained.

The cupolas are lined with standard fire clay blocks. The thicknesses of refractory used in various zones of the cupolas are shown in Fig. 2. When starting up, the cupola is charged with coke only, to a height of 60 in. above the tuyeres. The charge is lit and the coke is burned for 6 hr, during which time there is no wind on the cupola. The new brick lining is dried out during this 6-hr burn-in and when the coke bed is sufficiently hot the first charging takes place.

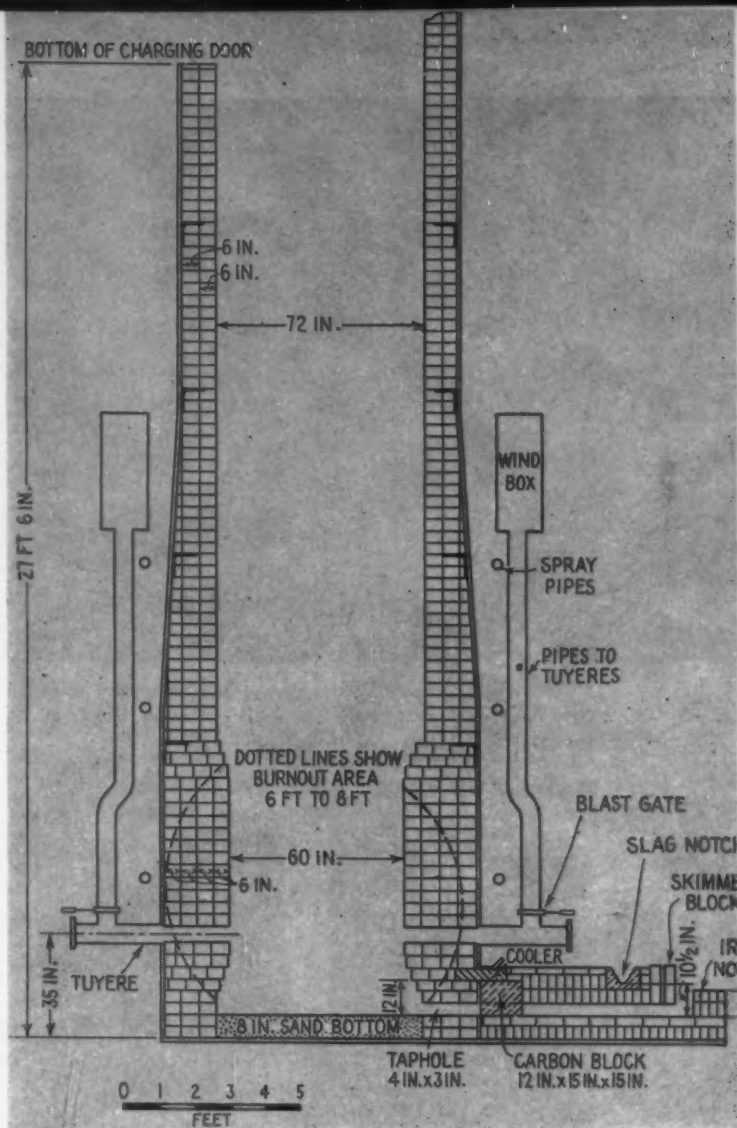


FIG. 2—A schematic cross section of the cupola design installed at Central Iron and Steel Div., Barium Corp., Harrisburg, Pa. Note thicknesses of refractories.

The first charge consists of six buggies each containing 3000 lb of iron scrap, 400 lb of coke, 100 lb of limestone and 20 lb of 50 pct ferro-silicon. Fig 3. shows a buggy being dumped into the charging door. The first tap takes place 35 min after melting is observed through the tuyeres. Usually slag runoff will start 25 min after the first iron tap and from then on the cupola taps slag and iron continuously.

The wind is turned on when the first metallic charge is made. A wind volume of 7500 cu ft per min is ordinarily used for the first 8 hr. After that the wind volume is progressively increased to 12,000 cu ft per min. The blowing pressure measured at the intake side of the wind box is 28 oz psi, early in the run. Over a campaign, the average blowing pressure is about 18 oz psi.

The exact charge used in the cupolas is dependent on the scrap available. The normal charge used is two-thirds scrap steel and one-third scrap iron with enough coke and lime-



FIG. 3—Each charging buggy dumped into the cupola holds 2000 lb of steel scrap, 1000 lb of cast iron scrap, 500 lb of coke, 115 lb of stone and 15 lb of ferro-silicon.

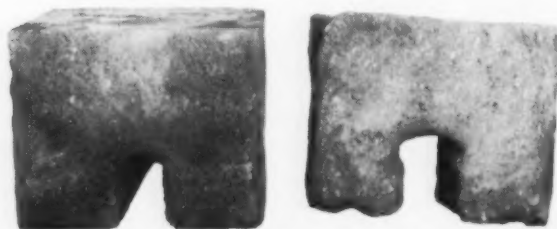


FIG. 4—Carbon tap hole block used at Harrisburg has licked a tough problem of refractory erosion. The new block on the left shows the original hole size. Typical of the same block after the cupola has completed 72 hr of melting appears at the right. Every type of refractory was tried.

Cupola hot metal (continued)

stone to melt and flux the charge. Table I shows the charge contained in each buggy and under normal operations 10 to 12 buggies are charged per hr. This charging rate supports a meltdown tonnage of 15 tons per hr.

The ferrosilicon is added to produce a hot fast flow of metal from the cupola and to obtain a higher silicon content in the metal when desirable. Foundry grade, by-product coke in a size range from 3 to 7 in. has been found best for Central's particular practice. The optimum size of limestone used is 2 to 4 in. The largest pieces of scrap ordinarily used are stripped motor blocks, weighing 500 to 600 lb each.

The average iron analysis obtained from the above charge is shown in Table II.

Although the hot metal is 0.75 to 1.00 points lower in carbon than the purchased pig iron which it replaces, the carbon in the hot metal is more efficiently used in the openhearth.

Steel melting is therefore not hampered by the lower carbon of the hot metal part of the openhearth charge. The higher sulfur content of the hot metal is easily and quickly reduced by soda ash treatment so that the sulfur content of the hot metal which is charged into the openhearth is similar to that encountered in the purchased pig iron. The sulfur is reduced to an average of 0.0455. Desulfurization is accomplished using 15 to 20 lb of soda ash per ton of hot metal.

The tuyere design used is different than that found in ordinary practice. Most tuyere openings flare out or widen at the hot end whereas a straight hole 4 in. high x 2½ in. wide is used by Central. The center of the tuyeres are 35 in. above the sand bottom.

Carbon block solves tap hole trouble

In melting, every effort is made to insure a consistent amount of molten iron in the well. Usually a molten iron level of 8½ in. above the tap hole in the slag separator is maintained. In order to control this depth of metal a consistent tap hole size must also be maintained. Considerable difficulty was encountered in tap hole size as the usual refractory materials eroded too fast.

Any major change in tap hole size, particularly in the upward direction meant that high blowing pressures could not be used because of the change in the static head of the molten iron in the slag separator. Lower pressures meant lower production so Central tried every type of refractory available.

They found that the carbon block tap hole shown in Fig. 4 best met their requirements, patent applied for. These blocks do not erode materially during the furnace run and most of the erosion that does take place is in the lateral direction which does not effect the static molten iron head and therefore blowing pressures.

Production averages 360 tons per day

The slag produced at Central averages 1.5 to 4.0 pct FeO and the arrangement of the slag notch can be seen in Fig. 5 and Fig. 2. The slag separator is 10½ in. above the bottom of the tap hole level as shown in Fig. 2.

The iron tapping temperature under normal conditions is 2750°F taken with an optical pyrometer. The iron is run off into the holding furnace shown in front of the cupolas in Fig. 6. This oil fired holding furnace (or mixer) will hold 150 tons of hot metal and can handle the full production of two cupolas. The average temp of the hot metal poured from the holding furnace into the transfer ladle, shown in the headpiece is 2650°F.

Daily iron production has been running about 360 net tons per day and has been as high as 460 net tons for 24 hr or 720NT per day with

TABLE I
TYPICAL CHARGE PER BUGGY

Material	Wt in lb
Steel scrap.....	2000
Iron scrap.....	1000
Coke.....	500
Limestone.....	115
Ferroallicon.....	15

TABLE II
AVERAGE IRON ANALYSIS

Carbon.....	3.0 pct
Manganese.....	0.30 to 0.40
Phosphorus.....	0.150 to 0.250
Sulfur.....	0.150 to 0.275
Silicon.....	0.70 to 0.90
Copper.....	0.25 to 0.60

two cupolas. A yield of 95 to 96 pct recovery in meltdown is standard practice.

The cupolas have met all demands for hot metal from the open-hearth shop. These five 150-ton open hearths use a 25 pct hot metal plus 15 pct cold pig and 60 pct scrap charging practice. Since the hot metal practice has been used, open hearth heat times in January have averaged 10 tons per hr compared to 7½ tons per hr when a 100 pct cold charge was used. This increase in steel production costs only



FIG. 5—Looking down on the pouring floor, the slag notch runner appears at the lower left.

\$1.50 per ton more in charging materials and has reflected in smoother steel operations, lower open hearth fuel cost, less bottom trouble and more consistent meltdown. Through the use of hot metal the steel plant has more direct control of the openhearth charge materials.

¹ "Cupola Hot Metal For The Openhearth," E. S. Kopecki, The Iron Age, Oct. 21, 1948, p. 77.

² "Water Cooled Cupola Features Duplexing Plant," E. S. Kopecki, The Iron Age, Aug. 19, 1948, p. 81.

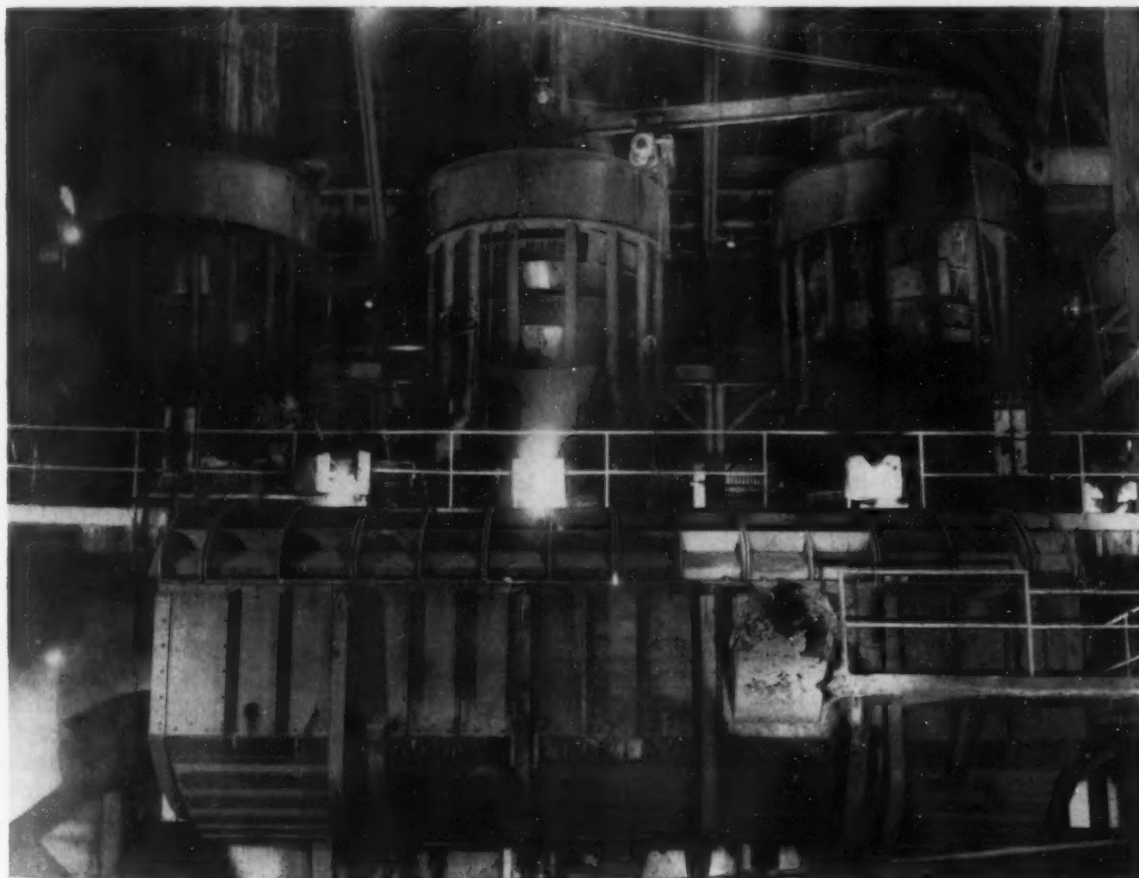


FIG. 6—Hot metal holding furnace shown in the foreground holds about 150 net tons. The three cupolas in the background supply all the hot metal needed for the five openhearth. No more than two cupolas operate at one time.

Beneficiation and conservation

spark



AIME ANNUAL MEETING.

Magnetite made from non-magnetic taconite highlighted the Minerals Division Meetings of AIME held last week in New York. The rest of the divisions of AIME were there in force also and presented their usual excellent technical programs.

The 173rd meeting attracted hundreds of engineers and technicians from the mining and metallurgical industries. The four-day meeting was crowded with technical sessions, committee meetings, and special events. The Woman's Auxiliary attended in force and held up their end in a strenuous four-day schedule of events.

Four student prize awards

One of the events held on Monday involved the Institute's Tenth National Student Prize contest. Another honor, the Robert H. Richards Award, was bestowed upon John Flickinger Myers, Tennessee Copper Co., for his work in mineral beneficiation. Three staff members of Carnegie Institute of Technology won the Robert W. Hunt Award for the best metallurgical paper of its type given during 1950. This paper, "The Mechanism of Sulfur Transfer Between Carbon-Saturated Iron and $\text{CaO-SiO}_2\text{-Al}_2\text{O}_3$ Slugs," was prepared by Messrs. Gehard Derge, W. O. Philbrook and K. N. Goldman. Mr. Goldman is now Senior Scientist, Atomic Power Div., Westinghouse Electric Corp., Pittsburgh.

Of the operating men, W. R. Bond, Vice President in Charge of Operations, Lone Star Steel Co., was the recipient of the J. E. Johnson, Jr. Award for his work in the utilization of East Texas ores.

A. B. Kinzel, President of Union Carbide & Carbon Research Laboratories, Inc., delivered the 29th Howe Memorial Lecture, top metallurgical award of AIME. Mr. Kinzel who is also Chief Metallurgical Consultant, Los Alamos National Laboratory, AEC, brought the convention up to date on the use of the electron microscope. He stressed the importance of this tool which permits magnifications of 20,000 and cited

the work done on low carbon stainless steels as evidence of its application. Mr. Kinzel told the group that as a result of recent studies at his laboratories on the shape and distribution of chromium carbides, a new concept of controlling carbon in stainless grades has been evolved which permits greater conservation of strategic alloys in the stainless grades.

The combination of nitrogen and manganese to replace nickel in some stainless types is being worked out successfully, Mr. Kinzel implied. Although this field was explored by the Germans, the real application of these steels in tonnage will be exploited here. Another conservation method has been the extra low-carbon stainless steels to replace types 347 and 321 formerly stabilized with columbium and titanium. It is in this field of carbide fixation that the electron microscope has facilitated a better understanding of how to save strategic alloys.

Beneficiation and upgrading of ores were featured in the technical sessions of the Minerals Div. R. V. Lundquist, United States Bureau of Mines, demonstrated the feasibility of upgrading manganese ores in his paper, "Upgrading Domestic Manganese Ores." Through a novel leaching process Mr. Lundquist declared that low-grade manganese ores can be upgraded as much as 40 pct, but he did not mention the economics of such a process.

Magnetic roasting perfected

F. D. DeVarez, Pickands, Mather & Co., unveiled a subject of long experimentation but until recently commercially unknown, "Magnetic Roasting of Lean Iron Ores." The new and now successful method of roasting makes non-magnetic taconite ores magnetic—making separation of the iron oxide from the gangue a simple and cheap beneficiation method.

The operation is carried on in a shaft furnace using a controlled atmosphere containing a low percentage of reducing gas. The temperature in the roasting zone is considerably higher than

Melting Points of Ti-Al Alloys

Wt Pct Al	Incipient Melting, °C	Completely Molten, °C
0	1690	1690
5	1710	1710
10	1700	1700
20	1670	1690
30	.....	1600
40	.....	1480

with the usual reducing gas and this speeds up the reduction time. Portions of the spent furnace gases are cooled and recirculated and this, together with the good contact between ore and gas, makes for high reducing gas utilization. The theory of the controlled atmosphere during the roasting operation can be best appreciated by the fact that magnetite (Fe_3O_4) is the only stable form of iron. If the proper ratio between carbon dioxide to carbon monoxide is maintained, such a gas will be reducing with respect to hematite (Fe_2O_3), and will be oxidizing with respect to both ferrous oxide (FeO) and to iron (Fe). The formation of ferrous oxide in a roasting operation is harmful since this oxide is non-magnetic, and if it forms in any quantity, will cause a substantial loss of iron in the ensuing magnetic separation step. By maintaining a ratio of approximately three parts of carbon dioxide to one of carbon monoxide, the resulting operation can be carried on at a relatively high temperature without fear of over-reduction.

Controlled atmosphere important

Specifically, most of the tests have been carried on at a temperature of from 1500 to 1600°F with an entrant gas containing approximately 5 pct CO , 15 pct CO_2 , and the balance largely nitrogen. The ratios shown of carbon monoxide to carbon dioxide, hold even though the bulk of the gas is an inert gas such as nitrogen.

A gas containing as low as 2 pct CO , together with 12 pct CO_2 and the balance nitrogen, is an extremely effective reducing gas in the 1000 to 1600°F range. The reducing gas is not limited to carbon monoxide and mixtures of hydrogen, and carbon monoxide may be used effectively providing that a somewhat similar ratio is maintained between the reducing gases and carbon dioxide and water vapor. For a more detailed explanation of the theory involved, the reader is referred to United States patents No. 2,528,552 and No. 2,528,553. Another interesting paper was presented by Carl Ludwig, The Bonnot Co., entitled, "Agglomerating Ores By Vacuum Extrusion."

The newer metals, titanium, zirconium, molybdenum, and vanadium received plenty of attention in the Institute of Metals Div. Titanium was the most popular as far as the number of papers presented. On Thursday a paper, "Constitution of Titanium-Aluminum Alloys," was delivered by H. R. Ogden, D. J. Maykuth, W. L. Finlay and R. I. Jaffee. Messrs. Ogden, Maykuth and Jaffee of Battelle Memorial Institute collaborated with



Top metallurgical honor of AIME went to A. B. Kinzel, who delivered the 29th Howe Memorial Lecture.

Mr. Finlay, Research Manager, Rem-Cru Titanium, Inc. on this paper.

They investigated the titanium-rich portion of the Ti-Al diagram between room temperature and 1100°C. Their tentative diagram is shown in Fig. 1. The solid lines indicate the phase boundaries up to 50 pct Al established by their investigation. The dashed lines are extrapolated and indicate probabilities based on observation. The phase boundaries over 50 pct Al are taken from work of other investigators. The solid equilibrium section is shown in Fig. 2.

Aluminum is one of the alloys used in commercial-titanium alloys and is employed along with other alloying elements. One alloy contains 4 pct Al, 4 pct Mn and another contains 3 pct Al and 5 pct Cr. The authors showed that the solubility of Al in alpha titanium is about 26 wt pct. The addition of aluminum up to 20 pct does not lower the melting point of titanium. However, aluminum over 20 pct drastically lowers titaniums melting point, as shown in the table.

A new phase was confirmed in alloys containing 34 to 46 pct Al and the first documented case

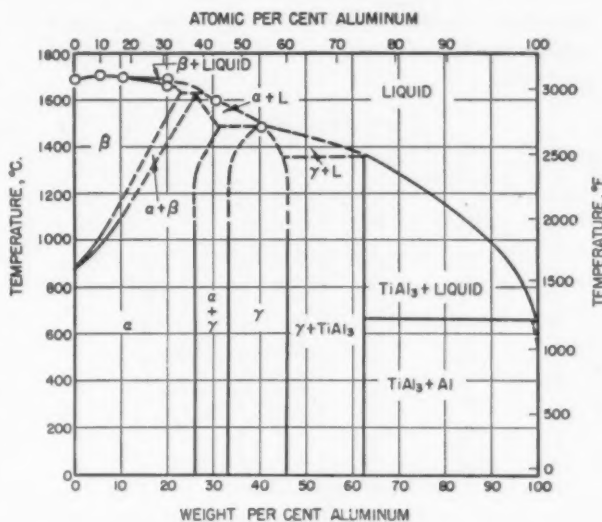


FIG. 1—Tentative phase diagram for the Ti-Al alloys.

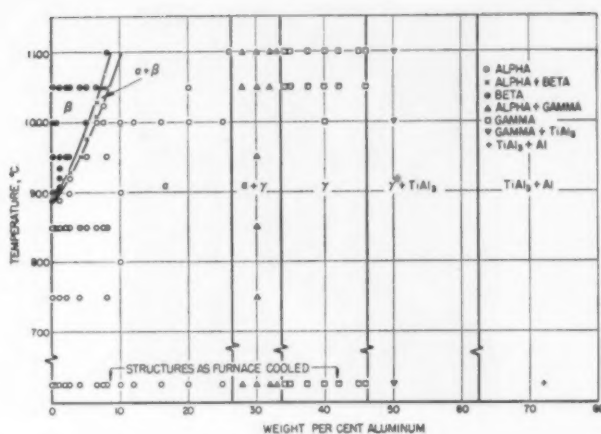


FIG. 2—Solid solubility section of Ti-Al phase diagram showing location of research data points.

AIME meeting (continued)

of a metallic alpha-stabilizing addition for titanium was shown in the two-phase field where beta solubilities are less than alpha solubilities.

The authors showed the effect of aluminum on lattice constants of titanium, Fig. 3. This particular part of their investigation paralleled another paper on titanium delivered by P. Duwez and J. L. Taylor in Wednesday's session on crystal structure.

This paper, "Crystal structure of Ti-Al," by the two men from Jet Propulsion Laboratory, California Institute of Technology, confirmed the solubilities of aluminum in titanium found by the other investigators. The crystal structure of Ti-Al is tetragonal and at 750°C the Ti-Al phase extends from 42 to 62 Al wt pct. The lattice parameters versus aluminum content found by these men, shown in Fig. 4, which supplements the data on parameters shown in Fig. 3.

Copper and aluminum were also covered in various papers given before the Institute of Metals Div. The electrical resistivities of oxygen-free copper, commercial 2S Al and "A" nickel wire were studied after different rates of prior strain had been introduced. This paper, "Effect

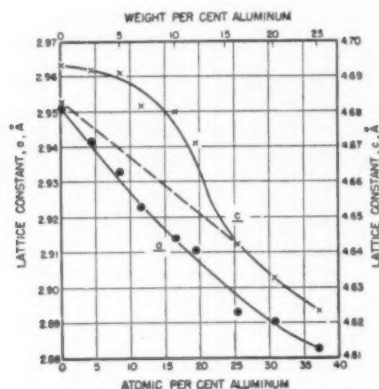


FIG. 3—The effect of aluminum on the lattice parameters of titanium v. the aluminum content.

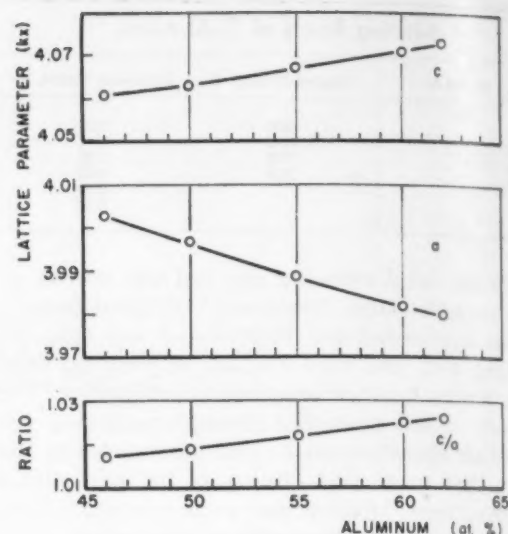


FIG. 4—Lattice parameters and axial ratio of Ti-Al phase v. aluminum content of the alloy.

of Prior Strain at Low Temperatures on the Properties of Some Close-Packed Metals at Room Temperature," was delivered by W. C. Ellis and E. S. Greiner, Bell telephone Laboratories, Inc.

These tests showed that the resistivities of copper and aluminum cold worked at the sub-zero temperatures were higher than the resistivities of these metals drawn equal amounts at 25°C. For copper reduced 85 pct, the increase in resistivity was from 2 pct when drawn at 25°C to 6 pct when drawn at -195°C. In the case of nickel, however, the drawing temperature had no significant affect on the resistivity.

Room temperature tensile tests showed that copper, aluminum, and nickel drawn at -195°C had significantly higher flow stresses in the plastic range than when reduced equal amounts at 25°C. Rolling aluminum, copper, "A" brass, and "A" phosphor bronze at -195°C resulted in similar enhancement of the flow stress.

The increase in resistivity and flow stress resulting from deformation at -195°C over that for deformation at 25°C is attributed to a smaller contribution from simultaneous recovery as the temperature is lowered. When metallic materials are deformed plastically, hardening and recovery occur simultaneously.

The net hardening may be considered as the strain hardening from deformation in the absence of recovery, decreased by the recovery or softening occurring during or immediately after the deformation. Recovery is a diffusive process, dependent on temperature and involves at the most only a few atoms in concerted action. Plastic strains produced by the deformation are partially replaced. The driving energy for recovery resides in the thermal fluctuations of the atoms, augmented by the stress field of deformation. Recovery is essentially absent, or very small, at low temperatures but increases with temperature. In the hot-working range, recovery is so rapid that no appreciable net hardening occurs.

Rebuilt broach saves \$400 per day

A rebuilt World War II broach at Detroit Arsenal does in 30 min a job that formerly took 4½ hr. Savings with one machine operating are \$400 a day. A huge index fixture handles the 6-ft tank ring gears for broaching 294 internal teeth.

A broaching machine which does in 30 min what former methods took 4½ hr to do is now in operation at the Detroit Arsenal of Army Ordnance. Manufactured and tooled by Colonial Broach Company, Detroit, the machine cuts 294 internal 4-pitch teeth in 6-ft diam ring gears for tanks in 30 min. Savings now amount to \$400 a day.

According to Army Ordnance officials, at least as much proportionately will be saved as other machines are installed. In addition, the machine eliminates ¾ of the capital outlay and 7/8 of the number of machine tools required in the method previously used.

To permit the broaching of the teeth in the



RING GEAR tooth broaching machine in operation. Fixture and workpiece, a 6-ft gear, encircle machine's column.

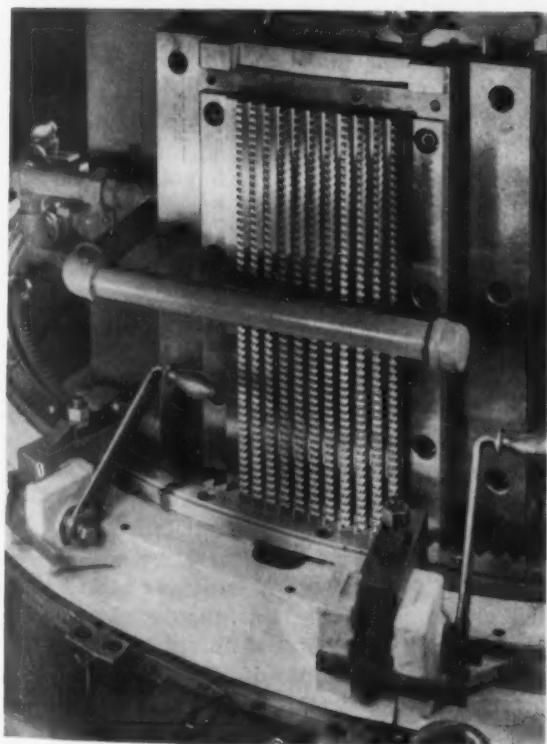
large ring, Colonial engineers designed a huge index fixture that encircles the 30-ton, 66 in. stroke vertical broaching machine.

Broaching of the 294 teeth is accomplished by a combination of indexing and shuttle movement of the fixture. In operation the fixture first moves into cutting position under an 11-tooth, 12-segment surface broach 9 in. wide by 60 in. long. After the broach has been passed through the work, the fixture moves out of cutting position and the broach is returned to the top of its stroke. Shuttle movement is accomplished through a hydraulically controlled locking cam action.

Indexing of the turret ring to the next cutting position is also accomplished by hydraulic cylinders. A hydraulically-controlled index pin locks the fixture in accurate indexing location. The turret ring is clamped in the fixture by hand clamps and is ejected hydraulically for unloading.

The teeth formed by the broaching operation are checked while the part is still in the machine. The gage that checks the part both for tooth spacing and size is integral with the index fixture and actually passes through the column of the machine. The teeth are held to a tolerance of 0.001 inches spacing by the broaching operation.

The broaching machine used is a surplus World War II Colonial vertical broaching machine, rebuilt to accommodate the 4-ton index fixture. Hydraulic power equipment that was formerly within the column of the standard machine is now mounted on a base at the rear of the machine to facilitate fixture mounting and provide additional hydraulic and electrical control functions.



ELEVEN-TOOTH broach used on tank ring gears. Gear is at final index position. At right and left are hand clamp handles. Across center is coolant pipe.

Fabricated Ingot Cars

STAND UP



By R. G. Fournie

Secretary
Continental Boiler & Sheet Iron Works
St. Louis

Few weldments have to face the rough conditions encountered by these steel mill ingot mold cars. Normal operation includes repeated heating and cooling from as low as zero to as high as 1200°F. Live load is 42 tons. Severe impact loads occur while the cars are at elevated temperatures. Here's how such cars are designed and fabricated to stand up under severe operating conditions.

Many unusual problems were encountered in the design and construction of a fabricated steel ingot mold car. The operational conditions for such cars impose extreme conditions which few weldments ever have to face. Both design and actual fabrication had to make special allowance for these conditions.

These ingot cars, designed for the Laclede

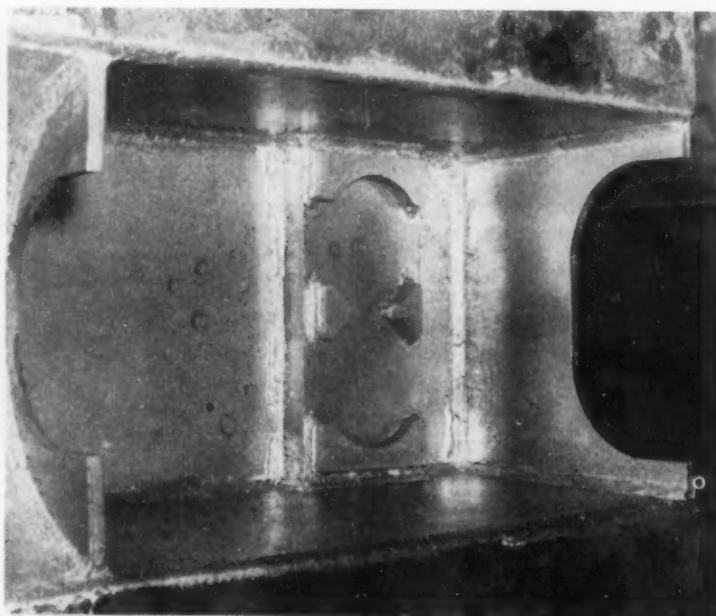
Steel Co., have to handle 42 tons of live load. They must withstand the heavy impact imposed in stripping molds from the ingots. The cars pick up enough heat from their loads to bring their temperatures up to 1200°F. At these temperatures they are subjected to severe physical shock. Design had to allow for thermal stresses, due to concentration of heat at points of loading as well as to repeated heating and cooling cycles.

While welded steel cars are not new, they are in a minority. All ingot cars are generally standard in size and shape except for minor variations to fill special needs which vary with different operational requirements. Building strength and stamina into a welded steel car conforming to general specifications, however, was another matter. This afforded a chance to improve over prior cars by means of plate fabrication and welding techniques.

A plain carbon steel was selected for the cars, for economy, strength, and ease of fabrication. The steel had a tensile strength of 67,000 psi, yield point of 42,000 psi, elongation in 2in. of 37 pct, with a hardness of 149 Bhn.

Welding procedure was planned to include three passes with three different types of electrodes. Fillet welds of 75,000 psi tensile strength in the first pass, 60,000 psi minimum in the second, along with impact resistance of 30 to 70 ft-lb and an endurance limit of 28,000 to 32,000 psi, were specified.

The car body is essentially a reinforced



WHEEL spring pads are cut from $\frac{3}{4}$ -in. plate, welded to 1-in. plate, then welded to car floor.

Under severe operating conditions

COMPLETED CAR, finished with aluminum paint, hangs from hooks of two cranes. Body of another car can be seen in the background.



hollow vessel 8 ft wide, 12 ft long, and 18 in. deep. Six reinforced openings extend through its entire depth to receive the plugs which extend beneath the molds loaded on it. Accommodations are provided in each end of the body for coil springs, spring pads, and single-axle wheel assemblies. The undercarriage suspension and spring bearing blocks are weldments. Journals are flame-cut from 5-in steel plate, and machined to receive roller bearings and cover plates.

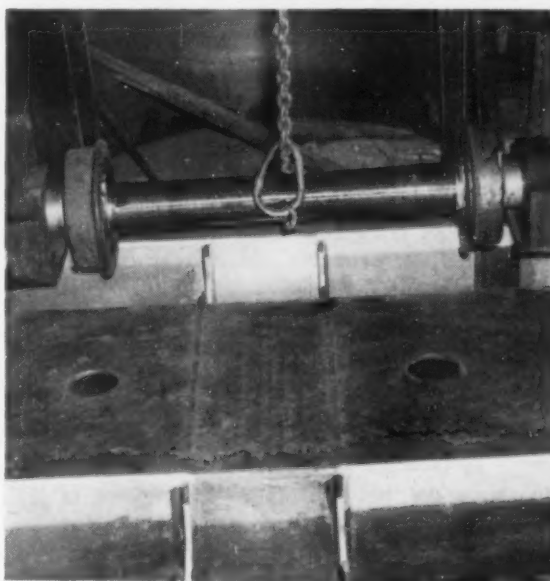
All fillet welds are gauged to $\frac{5}{8}$ in. to obtain welds equalling or bettering the strength of the members connected. Corners in stressed areas are well rounded to improve the shock and fatigue life of the weldment. The theoretical strengths of the steel and all welds are substantially above the load factor, to avoid fracture in service. Fractures frequently shorten the lives of ingot cars.

The bed plate is 1 in. thick. Side members, interior bracings, and bottom plates are $\frac{3}{4}$ in. thick. The side plates are 18 in. wide and about 19 ft long. These are formed to a sort of channel shape with webs of about 11 ft and flanges of about $3\frac{1}{2}$ ft. The web of each formed channel extends the length of the entire side of the car. The flanges are an extension of the side, to provide car end plates. They connect to steel posts on each side of the spacing provided for couplers.

The car has a slight apex at the center of

each end to allow clearance between cars in travel on radial track. This clearance is sufficient to eliminate possibility of car ends striking together, thus protecting them and the coupler operating levers from damage.

The interior backbone of the car is composed of two lengths of $\frac{3}{4}$ x 18 in. plate running the full length, one located on each side of the center and connecting to end posts astride the coupler pockets. These girders are braced with



SINGLE-AXLE truck with journals and bearings in place is lowered into position on upside-down car.



FINAL welding touches on nearly-completed car body. Three passes, with three different electrodes, are used.

Fabricated ingot cars (continued)

$\frac{3}{4}$ -in. plate sections just behind the couplers on the ends, parallel to and astraddle the centerline of the axles. Thus when the bottom plate is in place a box girder is formed. This boxlike section is further stiffened over each axle by the installation of curved formed plates welded into place over the axles.

Since the size and yield point of steel varies with temperature, working conditions had to be considered when estimating expansion, contraction, and residual structural strength under heat conditions varying from 0° to 1200°F. Conventional stress relieving probably would have been used if the car was to be in service at normal temperatures. But it was virtually useless in this case because cars are subjected to continuous uncontrolled stress relieving, in effect, in service. This could well cause warpage unless steps were taken in construction to prevent it.

Distortion minimized

By minimizing welding heat or inducing an even spread of it, and using a deep fillet technique which creates greater strength with less deposited metal, effective shrinkage due to welding was reduced. Plate preparation consisted only of properly cleaned square flame cuts, except on exposed edges where corners were rounded. Meticulous fitup has always been a must at Continental so careful assembly was obtained. This was a major factor in reducing distortion to an absolute minimum.

All joints were uniform. All plates were evenly spaced at all intersections by placing 5/65-in. wires between them during assembly. The spacing thus obtained resulted in even contraction throughout the weldment and did much to exclude distortion and cracked welds from the final product. The spacing wires also, to a degree, aided economy of production since

they provided a better welded joint without additional plate edge preparation. Distortion that could not be excluded was controlled.

The first pass of welding was applied intermittently throughout the car to minimize warpage and to distribute the heat evenly. Tack welds during assembly were carefully spaced and properly deposited. Lincoln LH-70 (E-6016) $\frac{7}{32}$ -in. electrodes were selected for use at 300 amp with the work negative.

After components were tackwelded in place, each intersection was built up to full size with stringer beads for a distance of about 4 in. in each direction from the corners. This procedure served to break up the magnetic field set up by the physical contour of the structure and materially reduced arc blow on subsequent passes. Completion of the first pass on all joints then followed with LH-70 electrodes throughout.

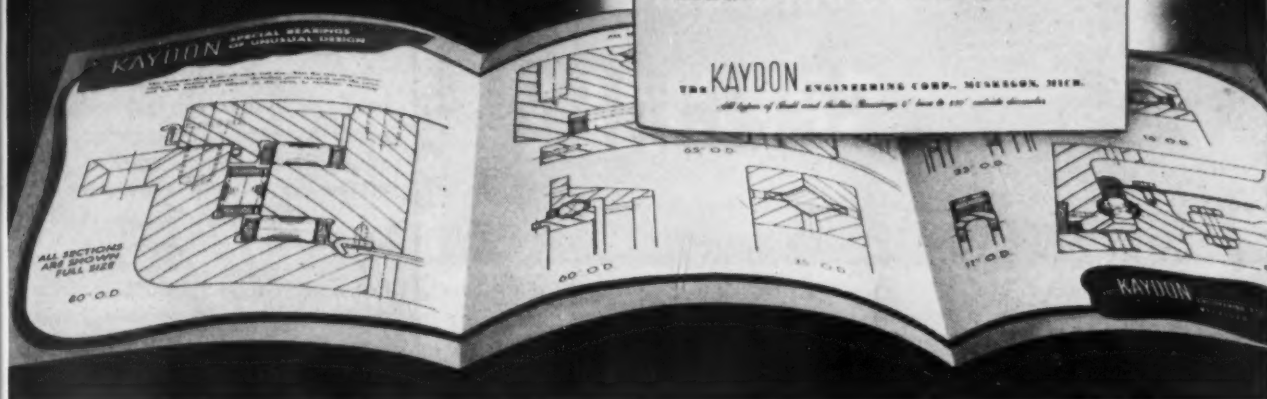
Consideration of new stresses that would be introduced with the second pass of welding was the next problem. It was decided to preheat the weldments before the application of subsequent welding passes. For this purpose, Continental made two long-handled torches to use natural gas from city mains. The main pressure was insufficient so compressed air was introduced into the flame. The temperature of the whole weldment was brought up to 200°F in 15 to 20 min. Temperatures were checked with temperature crayons. The cars were positioned to permit downhand welding.

Fleetweld No. 5 (E-6010) $\frac{1}{4}$ -in. electrodes were used to get a high degree of penetration and because of suitability in laying a flat bead on top of the LH-70. The amperage setting was 250 and of course the work was negative. The third and final pass was ac. with 5/16-in. Fleetweld electrodes burned at 400 amp.

The wheels, bearings, and journals were assembled onto the axles, and set into place as assemblies in previously aligned guides. Finally the couplers were placed.

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Free Literature

Continued

Magnetic gages

Magnetic continuous gages designed for use on rolling mills, shearing lines permit operators to know the exact thickness of the material at all times. As strip passes between upper and low gage rolls, variations in strip thickness cause variations in the electrical circuit. These are shown on the gage meter. *Pratt & Whitney Div., Niles-Bement-Pond Co.*

For free copy insert No. 15 on postcard, p. 121.

Wire straightening

Medart wire straightening and cut-off machines, described in a new leaflet, are fully automatic, compact and efficient. They permit greater accuracy at higher speeds than conventional equipment. The machines may be used with either cold-finished or hot-rolled stock. The hydra-electric automatic cutoff is of the flying type and is synchronized with the forward movement of the wire. *Medart Co.*

For free copy insert No. 16 on postcard, p. 121.

Motors

Construction details of explosion-proof, fan-cooled and non-ventilated motors are described in a new bulletin. The type APZZ motors are available in ratings of 3 to 100 hp and the non-ventilated type APKK are available in ratings from ½ to 2 hp. Elimination of enclosed external air passages eases the job of keeping motors clean. *Allis-Chalmers Mfg. Co.*

For free copy insert No. 17 on postcard, p. 121.

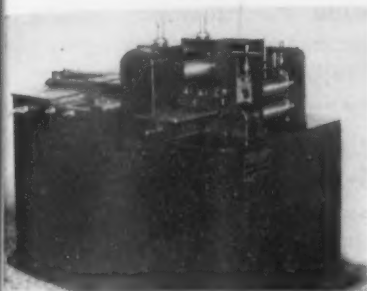
Refrigeration

Wider use of sub-zero temperatures in industrial processes has led to development of Revco refrigeration cabinets. Temperatures to -95° below zero are available for shrink fits, for seasoning gages and other precision tools and for testing. Cabinets are sturdy, all-steel, welded construction and sealed air and water tight. They are insulated with Fiberglas. Model RSZ50 operates at temperatures down to -30° below zero and is equipped with suitable cannisters for handling rivets. *Revco, Inc.*

For free copy insert No. 18 on postcard, p. 121.

NEW equipment

New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 121 or 122.



Machine edges sheared strip at 365 fpm

Edging of sheared strip on a machine developed by S. H. Coddington, is now possible at speeds up to 365 fpm. The edging machine handles widths from $\frac{1}{2}$ to $7\frac{3}{4}$ in., in gages 0.030 to 0.25 in. Strip or cut lengths are deburred in first set of rolls, and rounded in second verti-

cal roll set. The machine straightens and removes camber also. Rolled edges, perfectly round, can be made on gages up to 0.128 in. The machine weighs 2500 lb and measures 34 in. wide x 6 ft long x 33 in. high. *Merry Co.*

For more data insert No. 19 on postcard, p. 121.

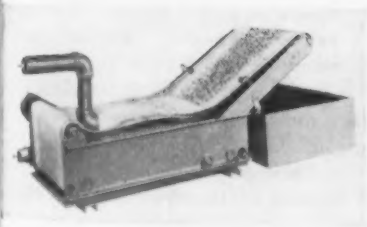


Turntable speeds heavy scrap cutting

A design feature of a scrap cutting installation at Allegheny Ludlum Steel Corp. is a turntable that gives considerable flexibility to the unit. An Oxweld machine carriage rides on a track, one section of which can be rotated horizontally to any desired angle. Since the direction of cut is always parallel to the alignment of the track, cuts can be made in any direction by

simply revolving the table. A swivel between the machine carriage and the horizontal support to which the blowpipe is attached provides additional flexibility of operation. An Oxweld C-60 cutting blowpipe is mounted on the rigid arm. Steel sections up to 5 ft thick can be severed with this powder-cutting equipment. *Linde Air Products Co.*

For more data insert No. 20 on postcard, p. 121.



Wet type filter handles large volume of coolant

Use of the complete filter bed enables this small, compact filter to handle a large volume of coolant. Endless web-type belt utilizes same filtering medium over and over; lasts for long periods of operation.

The filter is suited to serve individual machine tools or small central coolant systems, wherever a mineral or soluble oil coolant is used. *Honan-Crane Corp.*

For more data insert No. 21 on postcard, p. 121.



Positioner reduces handling and welding time

Medium duty welding positioners are available in 1000 and 2500-lb capacities. New design features compact, three-in-one table tilting frame. This eliminates the indirect power transmission trains used on older types of equipment, and reduces to a minimum backlash and lost motion in the table rotation system. Rotation speed can be varied through a 10:1 speed range

by handwheel adjustment. Models have hand or power tilting of the table through a 135° angle and are equipped with tilt indicators. All-steel, welded construction resists twisting and chattering. Optional feature is a reversing foot control for table rotation. *Reed Engineering Co.*

For more data insert No. 22 on postcard, p. 121.

Turn Page

New Equipment

Continued

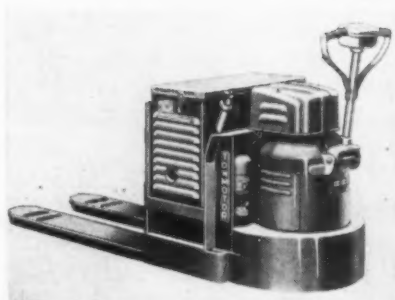


Jet blade inspection on production basis

Jet turbine blades can be 100 pct inspected for contour, thickness, tilt, and blade angle, at 18 to 26 or more points simultaneously, by a new multiple dimension Precisionaire instrument with an Airchart. Each gage can take the place of up to 11 conventional type gages. No master gages are required for setting the jet blade contour measuring fixture. A selected, carefully calibrated turbine blade is used as a mean master. Gage block buildups are used to properly locate the gaging head

mounting plates for the upper, middle and lower calibrated points of check. The gage heads are then clamped into proper position and feeler gages are used to set up the Precisionaire base instrument, for a theoretical perfect blade. Positions of the floats will then indicate how much the blade being checked varies with a theoretically perfect blade. Flexibility and adjustability accommodate changes of design. *Sheffield Corp.*

For more data insert No. 23 on postcard, p. 121.



Available power for 'round-the-clock operation

A built-in generator has been developed for use with Towmotor electric pallet trucks, eliminating the need for conventional electric storage batteries and re-charging. The new unit, called Towmotor Model W with Ready-Power, is an adaptation of the standard electric pallet truck, with a small, gasoline-

powered generator supplying constant, maximum voltage for operation of the truck. Current is generated immediately upon turning the ignition key and pressing the starter button, providing ample power to move up to 4000-lb loads 24 hr a day. *Towmotor Corp.*

For more data insert No. 24 on postcard, p. 121.

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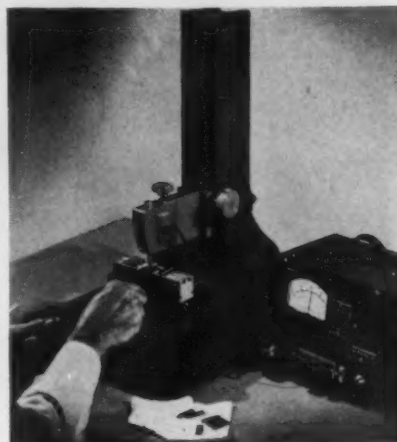
THE IRON AGE

Instrument checks dimensions in millionths

The Micro-Ac electronic micro-comparator gives reading directly in millionths of an inch and is designed specifically for gage room use and for ultra-precision production gaging. It consists of an induction-type gage head adjustably mounted on a rigid stand, and a high-stability four-tube amplifier with a two-scale meter. Gage head has a frictionless movement, with no mechanical amplification; the amplifier is free of drift; and read-

ings are not affected by any ordinary fluctuations in line voltage or by near-by magnetic fields. Consistent repeat readings are obtained on both continuous and intermittent use. The gage head is positioned by a rack-and-pinion vertical adjustment, and accommodates work of any height to 12½ in. above top of standard anvils. Adjustment is by turn of a knob. *Graham-Mintel Instrument Co.*

For more data insert No. 25 on postcard, p. 121.



Spirits washer features one-man operation

The loading and unloading of a new mineral spirits washer has been made a simple, one-station operation by the use of a return-type conveyor. Cleaning cycle consists of two washing stages and a forced air blow-off. Easily adjusted spray nozzles provide an even, all-over coverage of the parts being cleaned,

regardless of irregularities in shape. Safety devices are incorporated in this machine. The machine is designed to clean a variety of standard production parts, and can be adapted to many special cleaning applications. *Detrex Corp.*

For more data insert No. 26 on postcard, p. 121.

Turn Page

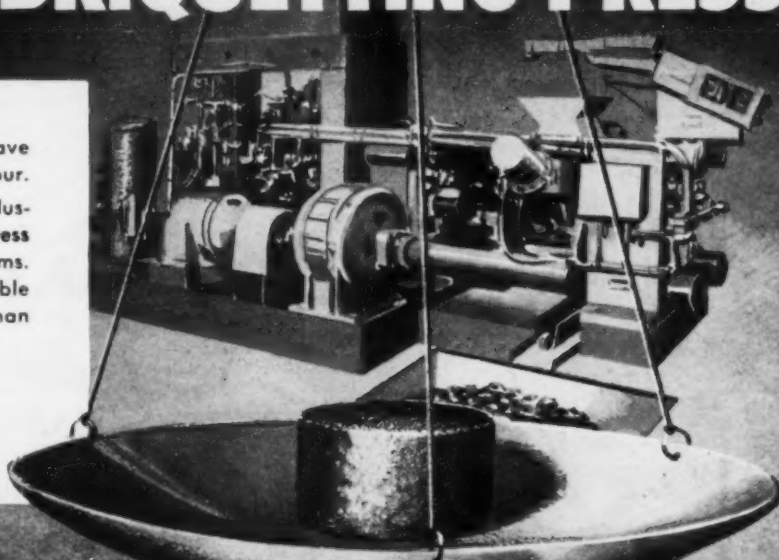


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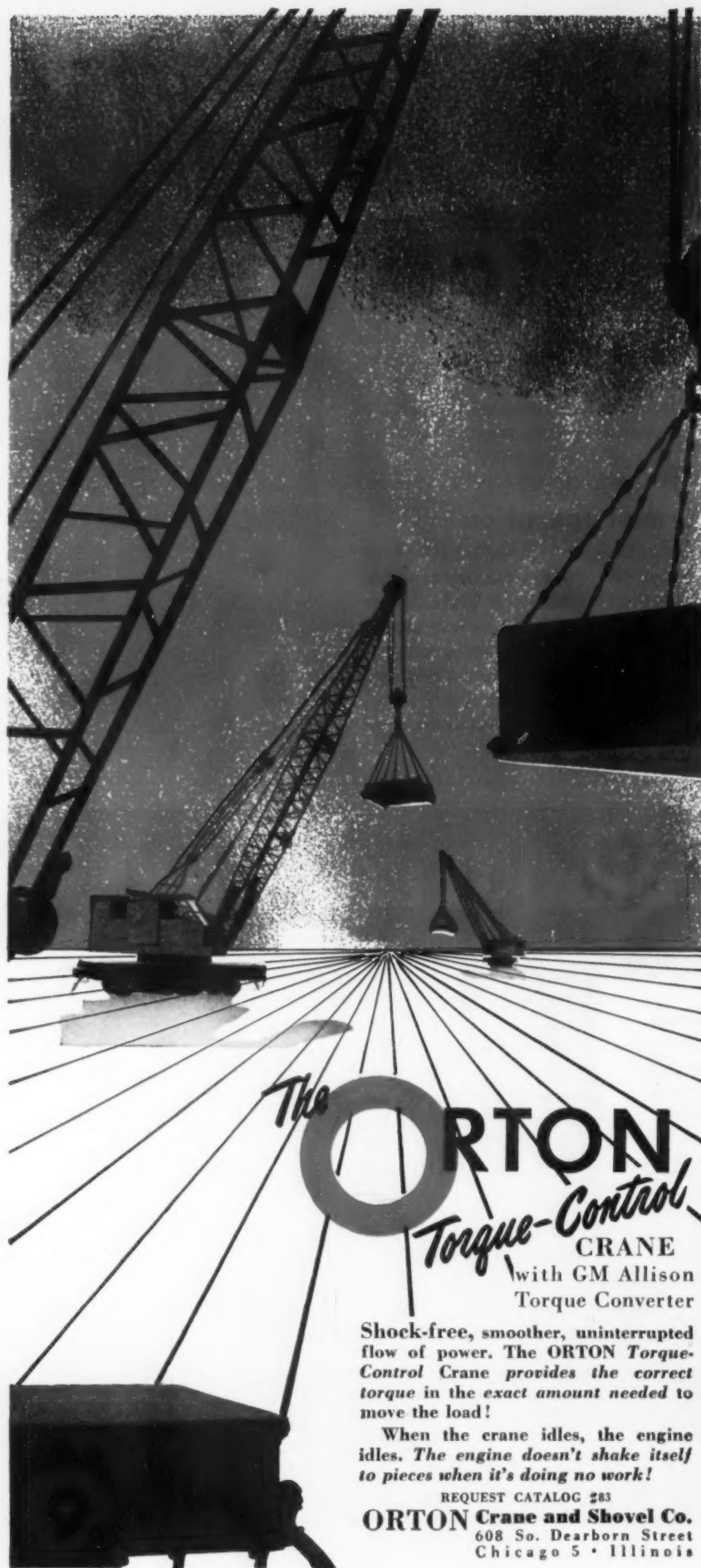
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REQUEST CATALOG 283

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New Equipment

Continued

Thread-cutting screw

A special thread-cutting screw has been designed for driving in holes that have become clogged with porcelain enamel as a result of finishing operations. Sharp edges of its four-sided reaming point scrape the hole clean and allow normal thread-cutting action to follow. The screw is suited for final assembly operations in the manufacture of stoves, refrigerators, washers, etc. *Shakeproof, Inc.*

For more data insert No. 27 on postcard, p. 121.

Bonder, leak sealer

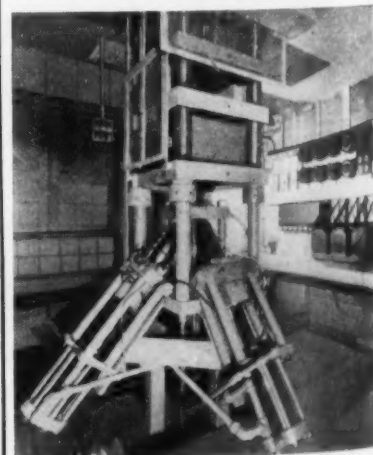
Seal-All is said to adhere to any material, toughen with age, and never become brittle. The new product bonds metal, glass, rubber, wood, fabric and plastic quickly and permanently. Seal-All is not affected by gasoline, oil, naphtha, alcohol or water. The product has been used to impregnate castings for prevention of leaks. *Allen Products Corp.*

For more data insert No. 28 on postcard, p. 121.

Plastics molding

A giant vertical molding machine is said to open a new field of products, such as battery cases, lighting fixtures, refrigerator parts, etc., to potential manufacture by plastic injection molding. Four huge preplasticizing units preheat the plastic material to give it greater flowing properties, which together with greater locking pressure on dies, permits the molding of pieces in extra large sizes. *Worcester Moulded Plastics Co.*

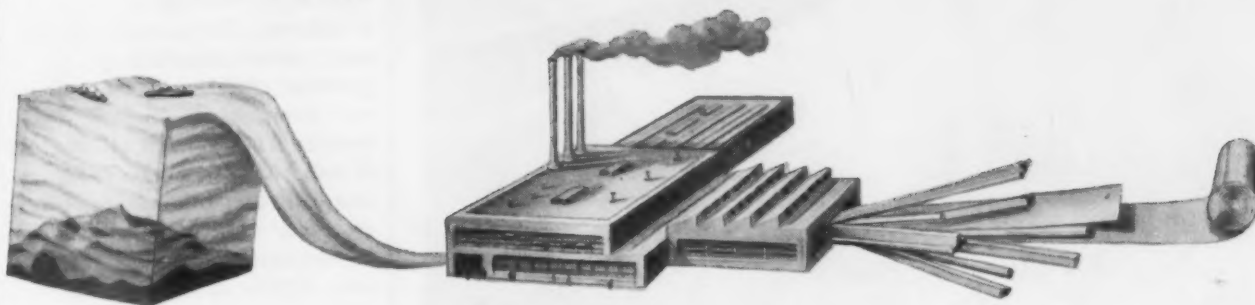
For more data insert No. 29 on postcard, p. 121.



Turn Page

MAGNESIUM

and the problem of **METAL SUPPLY**



for your product

The problem of metal supply is in reality a dual problem. First is the question of raw material supply and second, the supply of fabricated forms. To each of these, magnesium offers an interesting answer.

As the increased demands of industry call for more and more metal from Mother Earth, ore reserves become ever more important. Magnesium metal, now extracted from the sea, is the one metal with literally an inexhaustible supply. Consider this fact:

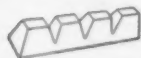
If magnesium were extracted from the sea at the rate of 100 million tons per year . . . the current rate of iron and steel production . . . for 1,000,000 years, we would have reduced the supply in those seas only from 0.13% to 0.12%!

And those seas are at our very shores, eliminating

the costs and hazards of transportation. Here is a potential of interest to every metal user.

At the other end of the supply problem is the question of fabricated forms. Currently, Dow is constructing an 84" hot and cold sheet and strip mill, the first in this country for magnesium. When completed, this mill at Madison, Illinois, will increase Dow's capacity for sheet, plate and strip by many times . . . with provision for even further expansion. This new Dow mill will also have facilities for extrusion, increasing present capacity appreciably.

Metal supply? Keep your eye on magnesium . . . the world's lightest structural metal . . . offering you the potential of infinite supply.



For Your Product . . . Tomorrow!

Magnesium's perfect combination of light weight and high strength makes it invaluable to our defense effort. "Drafted" today, it still deserves every consideration in planning for your tomorrow's product. Wherever a product is made to be moved or lifted, magnesium is a must. 75% lighter than iron, 30% lighter than aluminum, magnesium is the world's lightest structural metal.

Magnesium Division

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keeps you on the safe side



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Like these sturdy welding goggles, all Willson safety equipment is made after careful study of industry's needs. Through this continuing research you get many comfort and safety improvements first in Willson products. Ask for Willson—largest line of goggles and helmets for gas and arc welding.



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Adjustable leather nose bridge for extra comfort. Ample room for prescription glasses.



CHIP-WELD GOGGLE
No. DC53

Weld lens lifts up to leave clear Super-Tough® lens in place for chipping and inspection.

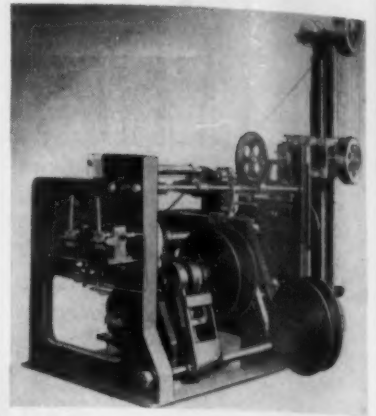


FLIP-FRONT HELMET
No. 60S

One-piece durable fibre shell with lift-up outer lens for quick inspection of work.

See your WILLSON distributor or write for bulletin
WILLSON PRODUCTS, Inc., 231 Washington St., Reading, Pennsylvania

New Equipment
Continued



Wire take-up

A take-up unit for electrical wire and cable manufacture has no gears or clutches; is built to operate smoothly at high production speeds. The reel drive is by double V belts, with a brake which automatically stops the reel as it is disengaged. Traverse mechanism is air-actuated and positive in operation. Choice of speed change methods for constant tension control is provided. The Davis-Standard take-up is built in sizes to take reels from 6 to 36 in. The machine is said to be free from noise and vibration. *Standard Machinery Co.* For more data insert No. 30 on postcard, p. 121.

Cuts deburring time

A deburring and barrel finishing compound is claimed to reduce deburring time by 75 to 90 pct and to cut deburring and finishing time in half or less. It is said to produce uniform radii on parts such as bearing races and retainers. It serves also as a good temporary rust inhibitor. The compound is a highly concentrated, non-dusting, granular composition, white in color and is used in small quantities. *Blue Magic Chemical Specialties Co.* For more data insert No. 31 on postcard, p. 121.

Dry-process molding

New treated materials, marketed under the name Cordopreg, consist of glass-fiber base materials impregnated with stable resins for molding of reinforced thermosetting plastics. Supplied ready to mold, it is said to offer production-line efficiency in many types of reinforced plastic molding. *Cordo Molding Products, Inc.* For more data insert No. 32 on postcard, p. 121.

Cutters for jets

Special carbide tipped cutters for milling the airfoil form of stainless steel jet compressor blades are designed to stand up under heavy cuts in this tough material. They are equipped with the grade of carbide that has proved best in long production runs. *Continental Tool Works Div., Ex-Cell-O Corp.*

For more data insert No. 33 on postcard, p. 121.

96 process points

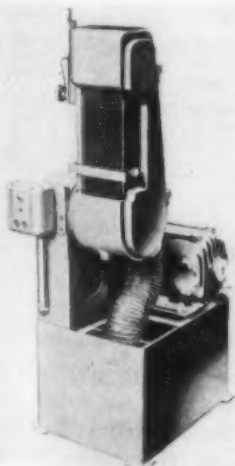
From a newly designed console desk, it is possible for a single operator to obtain plant temperature readings of up to 96 processing points. The 96 readings can be indicated in about as many seconds. The console is a 60-in. wide steel executive-type office desk arranged with cutouts to accommodate an ElectroniK precision indicator and key switch banks or pushbutton assemblies. *Minneapolis - Honeywell Regulator Co.*

For more data insert No. 34 on postcard, p. 121.

Abrasive-belt grinder

Equipped with a standard 6-in. belt that runs over a 12½-in. platen, a new all-purpose belt grinder is an economical size for medium work. It is used primarily for free-hand applications on work that requires flat surfaces, deburring, squaring, chamfering, rounding, and polishing. It is suitable for metal, wood, glass and plastics applications. By loosening two hex nuts, the machine can be changed over from vertical to horizontal operation in a minute. *Porter-Cable Machine Co.*

For more data insert No. 35 on postcard, p. 121.



AT THE
WORTHINGTON PUMP
AND MANUFACTURING
CORPORATION,
Buffalo, New York

tank heating is faster, costs less

with **PLATECOILS**

(REPLACE PIPE COILS)

Worthington Pump and Manufacturing Corporation has found that it costs less to buy and use Platecoils in their Parkerizing tanks than it does to make their own steel pipe coils. When the steel pipe coils were used, they had to be replaced on the average of every 3 months. The Platecoils have been in use over a year, and there have been no repairs or expenses other than the original installation cost.

Platecoils heat the tanks faster because they have greater prime surface in any given area. A 22" x 47" Platecoil gives the same heat transfer surface as 32 ft. of 1½" pipe. This not only means quick starts in heating tank solutions but also greater tank capacity for work.

"quick change hangers" make installation easy

By the use of "quick change hangers," Platecoil installations can be made in open tanks in a half hour or less by one man and a helper. There is no welding or pipe cutting . . . two connections to make and the installation is complete. Should repairs become necessary, Platecoils can be removed and replaced in a matter of minutes without emptying the tank. Replacement is made from outside the tank.

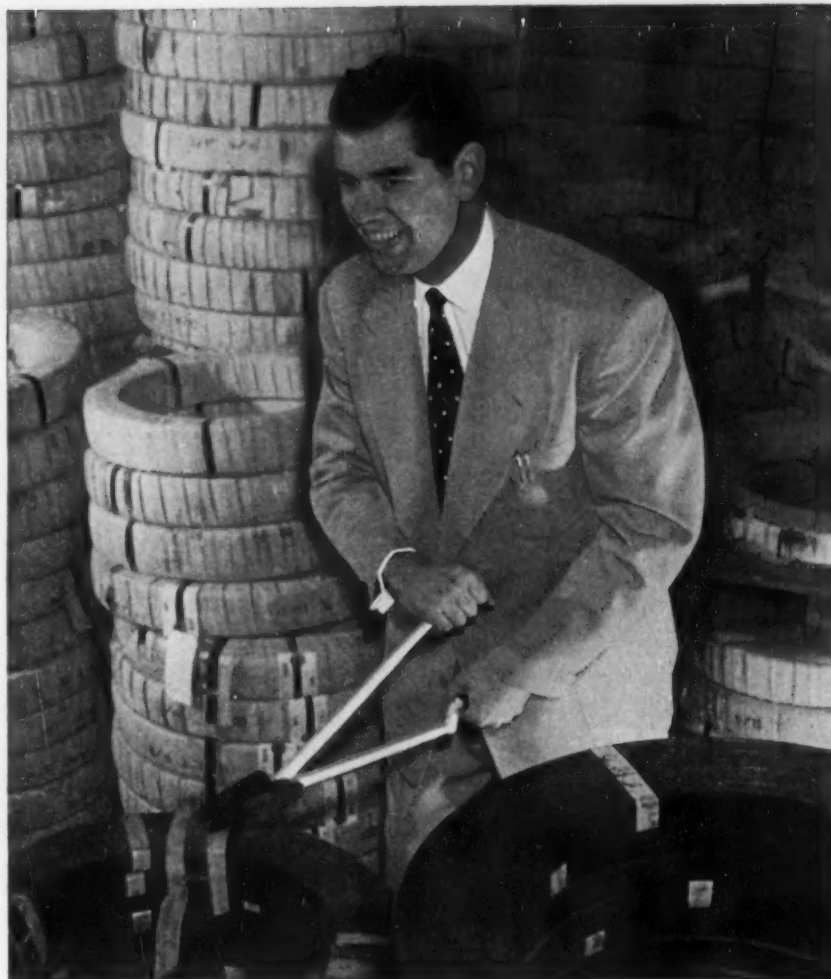
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LANSING 4, MICHIGAN



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That makes Bill happy, since Brainard representatives sell *with service*. They are warehouse conscious. They give personal attention to your packaging and shipping problems, and see that

the right equipment is applied to your operations.

To improve your materials handling, call on Brainard. Representatives and warehouses located throughout the U. S.; in Canada, P. J. McArthur Company, Toronto.



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For new catalog on Brainard Strapping System write Brainard Steel Division, Dept. O-2, Griswold Street, Warren, Ohio.

WARREN, OHIO

Technical Briefs

Forging Alloy:

Zirconium improves alloy, gives finer grain, higher strength.

A recently developed aluminum-forging alloy containing both zinc and zirconium offers increased ductility, decreased notch sensitivity and strength comparable to other commercial forging alloys.

Recently described by Chester J. Orciuch of the Wyman-Gordon Co., the alloy shows promise of being a better forging material in some applications.

Effect of the zirconium is to produce and maintain an extremely fine grain size. The alloy, known as ZK60, has strength comparable to the commonly used AZ80X alloy. It is somewhat more forgeable than AZ80X and appears to be less hot short, and requires lower forging pressures. Like AZ80X, it is not readily hammer forgeable.

Some difficulty in pickling this alloy was initially encountered, but has been overcome by a modification in pickling procedure. Use

TENSILE PROPERTIES — ZK60 V. AZ80X

Large Forgings, Quenched and Aged

	ZK60	AZ80X
Min Yield, psi	14,000	17,700
Max Yield, psi	29,500	38,700
Min Ultimate, psi	36,500	28,000
Max Ultimate, psi	43,300	49,000
Min Elong, pct	10.5	2.0
Max Elong, pct	26.0	8.0

Small Forgings, Quenched and Aged

	ZK60	AZ80X
Average Yield, psi	33,300	38,100
Min Yield, psi	19,000	23,700
Max Yield, psi	39,900	44,200
Average Ultimate, psi	45,100	49,400
Min Ultimate, psi	37,700	41,100
Max Ultimate, psi	48,800	54,000
Average Elong, pct	15.6	3.6
Min Elong, pct	8.5	2.7
Max Elong, pct	23.5	5.2

of the regular acid bath before the chrome pickle produced a non-adherent brown smut. Elimination of the sulfuric acid from the acid bath eliminated this difficulty.

Differences in physical properties obtained on small forgings made from ZK60 and AZ80X are shown in the table. In general,

ZK60 shows somewhat lower maximum and minimum values of yield and ultimate strengths. Based on averages, ZK60 shows a yield strength about 3000 psi lower, and an ultimate strength about 4000 psi lower. Average elongation is approximately 12 pct higher than AZ80X.

A comparison of the properties obtained on large forgings from ZK60 and AZ80X are shown in the Table. In this case, the ZK60 shows an average yield strength about 5000 psi lower, and an average ultimate strength about 2000 psi lower. Average elongation increase for the large forgings is the same as for the small forgings.

Finishing:

Aluminum parts dyed in single protective salt bath operation.

Gold, blue, green and other colors may be applied to aluminum in both a coloring and protective coating in one operation with a recently developed process.

The process, developed by Enthone, Inc., of New Haven, Conn., is known as Alumox 44. Aluminum parts, immersed in a salt solution, can be dyed to resemble solid metals.

Clear coatings can be produced which reduce finger marking and protect the aluminum against



"Did you let it leak out we were announcing a new product when you invited these gentlemen of the press?"

Engineering, production and economic advantages obtainable with forgings are presented in this Reference Book on forgings. Write for a copy.

METAL QUALITY

A Reference Book on Forgings

Never underestimate the preference of users of your product for the factor of greater safety that is inherent in forgings. This factor of greater safety results from toughness and strength, in correct proportion, as found only in closed die forgings. Consult a forging engineer about the mechanical properties required for your product.

DROP FORGING ASSOCIATION

605 HANNA BLDG. • CLEVELAND 15, OHIO

Please send 60-page booklet entitled "Metal Quality - How Hot Working Improves Properties of Metal", 1949 Edition.

Name

Position

Company

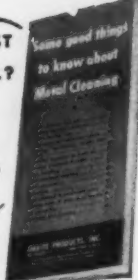
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WHAT'S THE FASTEST
WAY TO CLEAN METAL?

See page 11

WHAT'S THE MOST
ECONOMICAL WAY?

See page 9



**This FREE booklet on
Metal Cleaning** helps you get
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Among its subjects are:

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THE BEST WAY TO
STRIP PAINT FROM
METAL PARTS
TOO LARGE TO BE
SOAKED IN TANKS?

See page 3



**This FREE booklet on
Paint Stripping** helps you plan
better procedures. Read more about:

- How to strip large areas of structural metal? See page 5.
- How to strip metal parts in large volume? See page 9.
- How to strip oil-base paints? synthetic enamels? lacquers? alkyds? phenolics? ureas? See page 12.

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booklet: "How to Strip Paint."

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Technical Briefs

weathering. The coatings are relatively non-conductive and have a thickness of approximately 0.0001 in.

The process is not a substitute for electroanodizing. In most cases, the finish is covered with clear lacquer. Almost all aluminum alloys can be processed successfully including the wrought and the cast alloys.

The powdered salts are added to water in a concentration of 1 lb. per gal. The bath operates in the temperature range from 190 to 210°F. Coloring is accomplished in from 15 seconds to 2 minutes.

Steel Handling Simplified

Copies of the "Simplified Practice Recommendations R247-52, Packaging, Marking and Loading Methods for Steel Products for Domestic Shipments," are now available from the Government Printing Office, Washington 25, D. C. The 208-p. illustrated book was prepared by the Commodity Standards Div., Office of Industry and Commerce, U. S. Dept. of Commerce.

Carbide Brazed Without Strain

A method of brazing carbide tips to dial indicator points creates a firm bond without building up brazing strain in the carbide, it is reported.

Developed by the Eastern Tool Co., East Hartford, Conn., the method is said to eliminate tip fracture. High resistance to wear when in contact with revolving, cylindrical pieces is claimed.

Materials Handling on Film

A birds-eye view of overall pallet-loading operations is available on a 16 mm sound movie, "The Automatic Pallet Loader," produced by the Lamson Corp., of Syracuse.

The 15 minute movie shows how the loader takes cartons from the production line, moves them through various handling operations and delivers loaded pallets to fork trucks for storage.



When you have a READING CRANE installed in your plant, you get a crane CUSTOM-BUILT to meet your specific materials handling operation—at no added engineering cost!

Known as UNIT DESIGN, this unique method of crane construction reduces your costs in 2 ways.

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See your distributor for information on how you can get a READING CRANE "tailor made" to your own specifications. Drop us a line for your free copy of "The Why and How of Faster Production."

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Technical Briefs

Step Gage:

Spectrum color comparison key to measurement of very thin films.

Films only a few millionths of an inch thick can now be measured by visual comparison using a step gage developed by Dr. Katherine B. Blodgett of the General Electric Research Laboratory.

The step gage measures thickness by spectrum color comparisons. It consists of a specially prepared glass plate enclosed in plastic. Films of barium stearate are deposited on the glass in a series of 10 monomolecular layers. Each step is one microinch thicker than the preceding.

When illuminated by white light, each step reflects a color determined by its thickness.

To determine thickness of an unknown film, it is compared with colors on the gage to find the step with most nearly matching color.

The gage will be used in microchemistry for measuring of very small amounts of a substance laid down in a uniform film, such as vacuum evaporated films.

It can also be used, indirectly, to measure vapor presses and to identify temper colors on metals, and is adaptable for measurement of transparent conductive coatings on glass—such as aircraft windshields. Range of the new gage is from 2 to 16 microinches.



"Washington wants us to speed this order up; how many of you have had experience with 3-in. welding rod?"

THOMAS Flexible ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: 1/2 to 40,000 HP—1 to 30,000 RPM.

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35%
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AFTER USING

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PORCELAIN
ENAMEL

Damp anthracite, which produces sulphuric acid, posed the problem of severe corrosion to stoker screw and housings. Special acid-resistant ERIE Industrial Porcelain Enamel coating on these parts increased service life by at least 200%. This coating's lower coefficient of friction also decreased power requirements on the screw conveyor by 35%.

PORCELAIN ENAMEL SOLVES PROBLEMS

ERIE Industrial Porcelain Enamel has specially developed characteristics of high acid resistance, low coefficient of friction, excellent corrosion-resistance, abrasion resistance, heat and thermal shock resistance and good impact strength. If your product or component must meet any of these requirements, you are invited to submit a sketch or sample part with full details of operating conditions for ERIE'S Free Recommendations regarding the applicability of porcelain enamel.

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NO OBLIGATION

THE

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INDUSTRIAL DIVISION
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Technical Briefs

Molecules:

Spin studied with microwave spectrometer at Westinghouse.

How a molecule rotates, an aspect of molecular structure, is being studied with a machine recently developed by Westinghouse, the microwave spectrometer. One of the newest and most valuable scientific tools, it is an outgrowth of radar.

Molecular spin has up to now defied experimental study and is virtually impossible to calculate. With the microwave spectrometer energy at precisely known frequencies (to one part in a million) from a klystron is passed down a waveguide filled with the substance in question.

The amounts of energy absorbed at different wavelengths are registered as sharp lines on oscilloscope screens. From these absorption spectra, the nature of the spin of atoms in complex molecules can be determined.

The equipment and techniques are new. Last year the methyl alcohol molecule, lightest and simplest molecule capable of internal rotation, was analyzed. The instrument is being readied for studies of other molecules.

Furnace:

Redesign of annealing unit solves materials handling problem.

Re-design of a forced-circulation electric annealing furnace has eased materials handling bottleneck at Riverside Metal Co.

Three large heat elements were installed in the roof of the Lindberg furnace for more even heat distribution. Temperature in each of the three heating zones is automatically controlled through a system of nine thermocouples.

High and low temperature indication at two points in each zone permits uniform heat to be maintained accurately throughout the horizontal and vertical dimensions of the furnace.

The furnace was re-designed to speed intermediate stress relieving and annealing of large phos-

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Many other special cold formed electrodes to lick difficult clearance problems can be worked out by WW if quantities warrant the tooling. Give us the details of your problem.

WW

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PRECISION BALLS OF CHROME
AND STAINLESS STEEL, BRONZE
AND SPECIAL METALS.

WILLOW GROVE, Montgomery County, Pa.
Telephone, Willow Grove 1200

Technical Briefs

phor bronze rods between breakdown operations in the mill.

Heavy rods up to 5 in. in diam. no longer need be hauled to salt bath annealer, hoisted in and out, and hauled back to rod mill. Special cars to withstand high temperatures were designed and built at Riverside.

Cars receive rods at discharge side of breakdown rolls and are hauled by tractor to the furnace. There the loaded cars are backed directly into the furnace. When heat-treating cycle is complete, cars are withdrawn and loads returned to the mill.

At "ready-to-finish" stage, cars go to the pickling bath for final cleaning of rods prior to finished rolling.

Furnace capacity has quadrupled for intermediate stress relieving and annealing of phosphor bronze rods during breakdown. Present capacity is now 16,000 lb per day.

The 3-zone electric furnace is heated by an element in the roof of each zone. Furnace floor is level with the mill floor. The heating cycle is automatically controlled.

Cars are lubricated by insertion of colloidal graphite through holes in central spindle at front end and at each wheel hub. This provides lubrication at temperatures up to 1250°F. The mix consists of powdered graphite and mineral oil.



"Tell him to stop that confounded overconfidence and use a helmet."



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**Fewer
Rejects**

WITH

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It's good business to use ALSiMAG Ceramic Strainer Cores—they save you money in several ways. Fit snugly in the gate of the mold to strain the incoming metal—give cleaner castings. Easy to handle—speed production. Easy to store—save valuable foundry space.

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max. wall to $\frac{1}{2}$ " O.D.)
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The HOLE Story —by— Superior

Chapter 2

The Bubble That Beats Trouble to the Punch

In science, the arts and industry, fine small tubing serves many purposes, from the hypodermic injection of healing drugs to the control of hydraulic presses that produce airplane and tank components.

In every tubing job there is one prime requirement. The tube must not leak. Here at Superior we specialize in the production of high quality tubing in all practical metals... and we use many methods to insure the superiority of our product.

Precision gauges in the hands of experienced inspectors check for dimensional precision. High powered microscopes in our laboratories investigate grain structure. Chemical analysis maintains close control on metallurgy. And in our shops compressed air, under pressures to hundreds of pounds per square inch, is forced into tubing held under water to make sure that leaks are detected and eliminated.

The whole story of Superior is one of quality... in machines and methods, in men, and in the end result—fine small tubing to do tough jobs well.

This is a story with continuity, for our aim holds all ways to raise the standards by which we judge Superior tubing... and to continue to increase the rate at which we produce it to meet your demands.

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West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. UNDERHILL 0-1331.

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Certain analyses (.035" max. wall)
Up to $\frac{1}{2}$ " O.D.

Marginal Producers May Face Premium Price Cuts

Competition may force nonintegrated and marginal producers to trim prices . . . Would be last resort to get orders . . . Fear of strike, decontrol hope, dubious markets hold back cuts.

A steel price rise to accompany a wage increase might turn out to be academic to some small steel producers. Nonintegrated and marginal mills, who (because of higher costs) usually charge premium prices, are facing a sales vacuum on some light steel products. If the present market trend continues, they may have to cut their prices to meet competition.

But they aren't ready to rush headlong into price cutting. That will come only as a last resort to book orders—after all other possibilities have been exhausted. These three factors will cause them to proceed with caution:

Strike Threat—(1) Will there be a steel strike? Small producers know that a strike would immediately restore intense pressure on all steel products. This would permit them to repair their order books—at premium prices. Yet a strike would put more financial strain on them than it would on the larger mills. Since small producers are generally less mechanized, a wage increase would raise their costs more.

(2) Will the government relax controls on some products to permit more civilian production? Steel consumers have joined the industry in building a fire under this issue. Chances for decontrol are very bright. The big question really is how soon and how much will controls be relaxed? And which products will be first? The government will continue to drag its feet on decontrol until the wage-price issue is settled. This is in line with its policy of being reluctant to decontrol anything that might later become tighter.

Market Size—(3) Do makers of consumer durables actually have the potential markets they claim? Among these are autos and appliances. The former, especially, have been pressing for decontrol to help reduce unemployment. Though auto sales have been sluggish, manufacturers insist their spring pools of new cars will be far short of what they can sell.

The only catch here is that they need copper and aluminum to raise output more than they need steel. While there is some basis for hope that aluminum supplies will ease later this year, the copper outlook remains dim. The military cutbacks will mean a little more working margin between tickets issued and supplies of all three metals.

Soft Area—Detroit, historically the bulwark of steel demand, is currently one of the softest areas in the market. Steel salesmen are out ringing doorbells, trying to line up competitors' customers. Auto steel buyers are sizing up what is being offered and taking their choice of tonnages available. Some are not taking up their entire quota, although the unwanted portion has not exceeded 5 pct for most firms. Steel producers have been selling the "bonus" tonnage in other areas.

But this isn't true of all steel products in Detroit. One steel mill says it cannot book a ton of cold-finished bars over 1 in. until next August. Reason: directives. These are playing hob with the cold-finished bar picture. Big tonnages of this item are going into a military product. But generally steel demand has become easier.

Tight Elsewhere—An IRON AGE survey of other areas shows that cold-finished bars are extremely tight in all quarters. Indications are that non-defense customers may be cut still deeper on this item in the third quarter. Those who can substitute will be lucky.

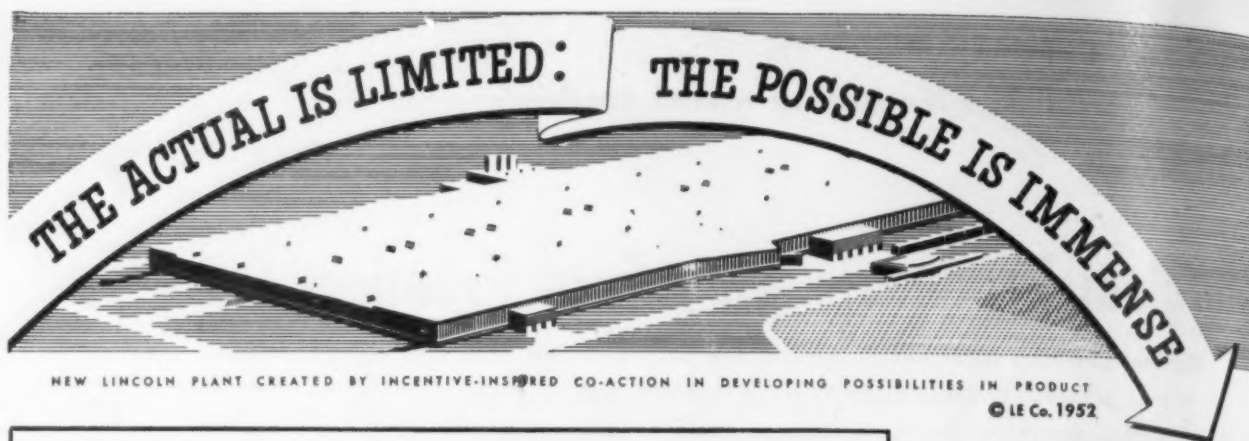
Large-diameter pipe is another item that shows no signs of easing. Pipe 3 in. and over, while not booked, is promised to capacity through the third quarter. Oil well people are due to get larger supplies. A goal of more than 45,000 new wells has been set for this year. And more than 25,000 of them will have to be drilled in the second half.

Hard to Find—Oil country conversion demand is active where arrangements are feasible. But, even when suitable semi-finished steel can be obtained, it is difficult to locate space on finishing facilities. One mill was offered a fair-sized tonnage of billets for pipe conversion but turned it down because it didn't have space to accommodate it.

The surplus of sheets is being increased by tinplate producers. Hampered by tin restriction, they are turning out more sheets to make up for the loss in tinplate output. If the government were to relax controls, these sheets would be taken out of the market.

Cast Weak—Cast iron scrap price declines first reported in THE IRON AGE last week are holding fast. Some previously reported under-ceiling prices have again dropped by as much as \$2 to \$3 a ton. The softness continues in other areas which last week were still holding at ceilings.

Steelmaking operations this week are scheduled at 101 pct of rated capacity, up half a point from the previous week.



WELDED DESIGN IMPROVES APPEARANCE

... while cutting costs 50%

By converting to welded steel, this progressive manufacturer has achieved a more modern, better selling appearance for his products. At the same time he has cut costs 50% on some components.

Pleasing appearance in a product generally indicates efficient use of materials in its design. With welded steel, cumbersome and often costly dead weight, inherent with gray iron, is essentially eliminated. Wall thicknesses in steel are of exact design size. In addition, steel can be shaped at low cost with simple shop equipment.

While attaining stronger, more rigid products, in addition to improved appearance, savings in materials alone often run as high as 85%. Your Lincoln representative can show you how to apply the cost-saving benefits of steel to your products. Call or write.

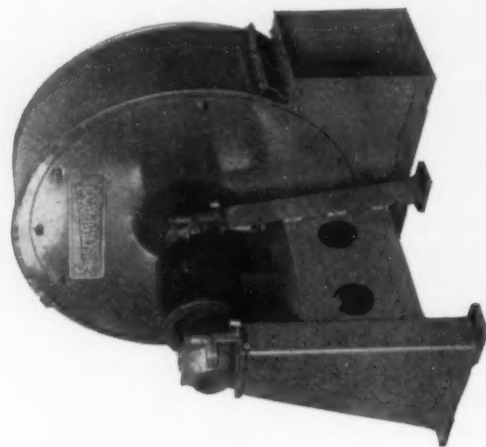


Fig. 3. Steel-Designed Blower built by The Boardman Company, Oklahoma City, Oklahoma. Eliminates milling and drilling operations... is easier to clean and paint.

Incentive Management—A thought-provoking approach to developing greater teamwork between employee and employer. Written by James F. Lincoln. Price only \$1.00 postpaid in the U.S.A.; \$1.50 elsewhere.

**PROPER DESIGN
IN WELDED STEEL
ALWAYS IMPROVES PRODUCT
AND LOWERS COST**



Fig. 1. Original Construction. Required 41% more metal than present welded steel design. Heavier weight with gray iron added to handling costs in shop, in shipping and final installation.

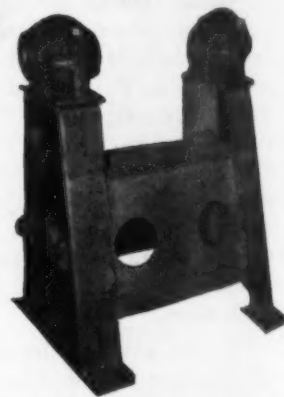


Fig. 2. Present Weld design in Steel. Saves 50% on cost. Has better appearance... greater selling appeal. Is stronger... more rigid.

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THE LINCOLN ELECTRIC COMPANY
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Market Briefs

Costs Down—Now that the Canadian dollar is about on a par with the U. S. dollar manufacturers there will be able to purchase key raw materials in greater volume and at lower cost across the line, it was pointed out at the monthly meeting of the Purchasing Agents' Association of Toronto. This should have a stabilizing effect on consumer prices in Canada. But this relief from the inflationary trend may not persist when approved defense production really gets going and bidding starts for available supply of raw materials. In some cases lower costs of raw materials have been sufficient to offset other cost increases and held prices in line. It will not take much to upset the present equilibrium and start the price uptrend again.

Keen Bidding—A recent Fort Mifflin, Pa., Army construction job provides further evidence of high competition in the contracting trade. (THE IRON AGE, Feb. 14, p. 85). The job called for only 32 tons of structurals and only \$28,000 had been appropriated but Corps of Engineers got over 50 requests for blueprints. This resulted in no less than 27 bids ranging from \$44,560 down to \$26,769.

New Plant—A contract is expected to be signed soon calling for construction of a \$4,250,000 manganese processing plant at Batesville, Ark. The government is expected to put up about \$3,500,000 of the cost and the Westmoreland Co., of Batesville, the remainder. The plant is to be privately operated.

Early Season—Great Lakes shipment of iron ore may start earlier this year, according to reports issued by U. S. Coast Guard. Car ferries are now shipping from Detroit to Lake Erie ports and ore shipment can be expected to begin during mid or late March.

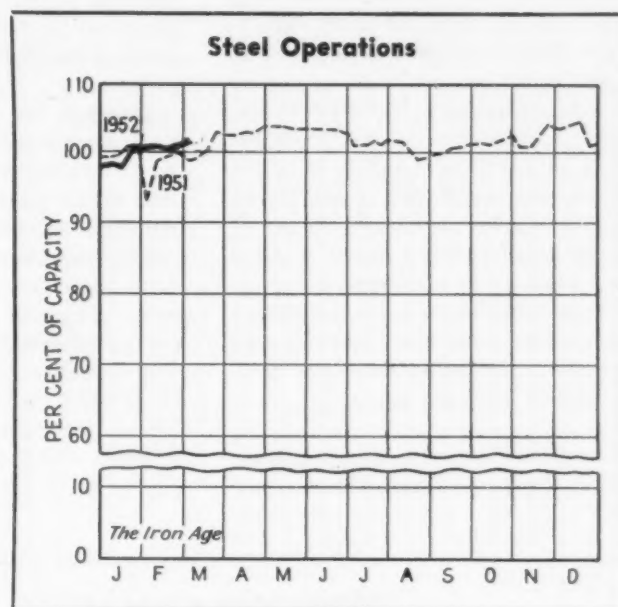
Who Has Tickets? — That's what a number of steel-makers would like to find out. Formerly CMP ticket holders had to search for a mill that could honor their tickets. Now mill salesmen are out looking for the ticket holders. The height of frustration is when the salesman finds a customer who wants a good quantity of sheets but has no tickets. One such customer, who claims he needs 900 tons to keep his plant running was allotted only 300 tons. An appeal got him 190 tons more.

Price Rise — London sources report that the British Government this week increased steel prices by an average of \$10 per net ton. This will yield \$156,800,000 towards meeting the cost increase of \$210,000,000 per year but it still leaves \$53,200,000 for industry to pay from its earnings.

Won't Interfere—Office of Price Stabilization has told motor carriers it will not try to intervene before Interstate Commerce Commission to protest freight rate increases the carriers will seek. Increases to be asked by the carriers could result in rate hikes of as much as 15 pct. Increases are needed, industry spokesmen told OPS, to offset increased labor costs.

Steel Easing — Consumers generally reflect the easing steel market on some products. One consumer reports no trouble at all since the first of the year in getting carbon sheets, bars—of some sizes—and even plates. He hasn't bought premium-priced steel since last fall. In fact, he would now like to sell off some of his inventory of carbon steels. But the same source reports large diameter bars and all alloy steel products still critically short.

Reprieve—National Production Authority has amended its automobile graveyard order to give wreckers an extra 30 days to get rid of excess stocks of scrap. Starting Apr. 1, a wrecker may not buy vehicles for scrapping unless he has disposed of an amount of loose scrap and vehicles equal to his Dec. 1 stock of autos manufactured before 1946. Same turnover must be made in succeeding calendar quarters. Under the earlier NPA order, the first turnover was to have been complete Mar. 1.



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Feb. 17	102.0	101.5	101.0	100.0	102.0	104.0	100.5	103.0	102.0	104.0	96.0	88.6	92.5	100.5
Feb. 24	104.0	103.5	100.0	100.0	104.0	104.0	98.0	103.0	102.0	104.0	91.5	85.6	106.0	101.0

Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.

Nonferrous Markets

Wait Early Lead Control Easing

NPA expected to allow 60-day inventory, free use entirely . . . Market tone much easier . . . Indonesian tin negotiations resumed . . . See aluminum market shift—By R. L. Hatschek.

Early this week it was expected that National Production Authority would announce the relaxation of lead controls. The proposed move was a modification of the existing lead order, M-38, not a complete revocation of it as had been requested by industry men. This followed the word from England that secondary and scrap lead were to be decontrolled price-wise effective Feb. 23.

The British price controls were becoming academic since prices had already slipped below the permitted ceilings. Latest note from that country indicates that the price of pig lead has been reduced 6.25¢ per lb to 21.25¢, delivered.

Keeps Some Features—Changes scheduled for the lead order were an increase from 30 to 60 days in permitted consumer inventory; no use limitation; retention of the reporting feature by both producers and consumers; quarterly allocation rather than monthly with the buyer getting 95 pct of his March allocation for April and 90 pct of it for the following month and being allowed to accept delivery all in one month provided the 60-day inventory were not violated; and provision for supplementary allocation to hard-put users.

Market Softer — Lead sellers, particularly of foreign metal, are

running into a bit more difficulty in selling as consumers watch for further developments. This may seem surprising in view of the recent elimination of the import tariff but supplies are in very much better shape than they have been. Despite this apparent softening, the 19¢ per lb price remains firm although this could change with the same rapidity that the supply-demand situation has already demonstrated. There have already been a few instances of reduced prices for scrap lead reported in some districts.

Zinc supplies are a bit freer as well but not nearly to the extent that lead has improved. Galvanizers are still using all they can get and would like more since galvanized products are still in very tight supply while plain flat-rolled steel is relatively easy to come by.

Resume Tin Talks—U. S.-Indonesian tin negotiations have started up again but at press time there was no indication of what the Indonesian mission had to say after contacting their government. The four main points in the discussions are price, quantity, length of the agreement, and proportion of concentrates to metallic tin. Desired price was \$1.25 per lb over a 3-year period but Reconstruction Finance Corp. wanted to hold the line at \$1.18 since it must raise its

buying price for Malayan tin if more is paid to any other producer, according to the recently closed contract with England.

The Indonesians had offered a low price for the first year and a higher price for the ensuing 2 years, according to a rumor which went on to say that this was refused because of its unethical nature. This report went unconfirmed.

RFC Stocks—RFC, in a detailed report of 1951 operations, disclosed that it had purchased only 790 tons of tin during the year and that was before March. Reserve stocks of the agency dwindled to 7050 tons by the end of the year. The Texas City Smelter received 28,606 tons of tin in ore and concentrates throughout the year of which 12,406 tons was delivered in the second half. Receipts from Bolivia dropped from 8126 tons in the first half to 4869 tons in the second, accounting for the drop in total for the second 6-month period.

RFC-held stocks of concentrates and other tin-bearing material contained an estimated 11,878 long tons of tin as of Dec. 31.

Picture Changing—Signs already on the horizon are pointing toward an aluminum market similar to the steel market in which apparent demand is quite soft while total demand is being suppressed by controls. Production will have a lot to do with this metamorphosis—output today is at the rate of 77,500 tons a month and will reach 100,000 tons a month before the end of the year.

But the main factor is the slowdown in military schedules and lack of cashing CMP tickets by firms in defense production. Aluminum fabricators say they have plenty aluminum for defense orders and think NPA should allow them to put the rest into civilian production. Civilian products are slated for 30 pct of their base period use of aluminum in the second quarter.

NONFERROUS METAL PRICES

	Feb. 20	Feb. 21	Feb. 22	Feb. 23	Feb. 25	Feb. 26
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered ...	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	\$1.215	\$1.215	\$1.215	.....	\$1.215	\$1.215
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	18.80

Note: Quotations are going prices.

Iron and Steel Scrap Markets

Scrap Traffic Off Congested Street

Movement of openhearth grades loosens up . . . Demand continues strong but mills inspect with glasses on . . . Spring thaw nears . . . Cast market still mired, below ceiling prices stick.

Scrap dealers will confidently tell you that demand for openhearth grades of scrap iron and steel continues unabatingly strong and won't lose any of its robustness for the rest of 1952. But they will admit that scrap traffic has moved off the congested street and for the first time in many months buyers are not at the wailing wall.

Some of the yells you still hear when scrap moves out-of-the-district on allocations are being voiced as a matter of principle. And many of the steel mills' inspectors have put on their glasses to check quality of scrap. This last is a sure sign that the pinch, although tight, is not hurting as much. The coming spring thaw is dissolving worried looks.

Stockpiles are still flatter than they should be. But the old set of operating procedures have been chucked aside. Inventories of 60 days for safety are no longer practical and National Production Authority has set the high mark for stockpiles. When you accumulate that much you're out of the market.

Area surpluses of openhearth scrap are seen by the trade as being temporary and in the long pull in 1952 scrap will continue to be in scarcity. Mounting war production will generate more scrap this year. When defense accelerates steel will be dragged out of inventory and processed. Some scrap men believe that a minor reason for severity of the shortage has been the pile-up of military steel in inventory.

The cast market remains becalmed and areas that had reported below ceiling quotations stuck by them this week. In the case of Birmingham prices slid deeper into the hole. St. Louis reported a railroad sale of cast that amounted to \$8 below OPS ceilings.

Pittsburgh—Inventory position of consumers in this area is improving slowly. Scrap quality has improved along with (1) a relatively easier market, (2) stricter mill inspection, and (3) increased activity of OPS inspectors, who are showing up unexpectedly at dealers' yards and mill receiving points. They are asking the right questions, too. Foundries are out of the market on cast, and mills are limiting freight on charging box and motor blocks. One mill has held up shipments of charging box cast.

Chicago—Openhearth and electric furnace scrap continues to move well. There are indications of a slight weakening in electric furnace, but this is spotty. Meanwhile foundry grades 20 and 21, while continuing in demand, showed a weakening market. The cast market was stagnant with cast inventories accumulating. Buyers were shying from freight costs, removing their springboards, or cutting buying altogether. Drops of \$2 to \$5 were reported in several cast grades below OPS ceilings, but these were occasional and the majority of yards were not moving their cast.

Philadelphia—With unstripped motor blocks slipping below ceiling in some districts, dealers here are thinking about stripping the blocks themselves in view of the \$52 ceiling for clean auto cast. A lot of cast is moving in the \$47 charging box category but no sales of engine blocks were reported in the last week. One electric furnace is back in the market but the tempo is still waltz-time.

New York—At press time a major cast consumer of the area was due in the market. Otherwise the cast market showed great sluggishness and no true test to determine just how prices would stand or fall had come about. Brokers here say the cast market, although slow, still has greater strength than in some other areas where the bottom has caved in.

Detroit—Reports of cast iron sales at less-than-ceiling were slowing down this week but informed sources continued to insist that unstripped auto blocks were being bought in small quantities as much as \$3 below ceiling. Simultaneously, foundries were reporting purchases of No. 1 cupola at ceiling prices. Trade talk centered on OPS prosecution of two Pontiac dealers accused of adulterating scrap bundles.

Cleveland—Mill inventories of openhearth scrap are gaining slightly. Although mills are not as worried as formerly, they have not reached the point where scrap is not a major consideration. Dealers are worried over the drop-off in collections due to decline in waste paper prices, discouraging peddlers from making their rounds. With some consumers not buying, blast furnace grades are being shipped out of the district. Cast continues weak.

St. Louis—A sizeable tonnage of heavy breakable cast to St. Louis district consumers moved during the week at what amounted to \$8 below the ceiling price. This was accomplished by brokers selling at a delivered price and absorbing freight charges amounting to \$8. Brokers bought the scrap from a railroad, and could have gotten more.

Birmingham—Steel scrap is flowing very freely into the district now and mills do not appear too anxious to buy a heavy tonnage, possibly believing steel will follow the trend of cast and drop lower. Scrap drives, dealers say, are having good results. Cast prices in the categories for which there is a market here took another drop this week and dealers pessimistically predict it may go even lower.

Cincinnati—Pressure on openhearth grades has eased somewhat due to relatively comfortable position of local mills. Collections in this area are also being adversely affected by decline in waste paper prices. Cast market continues extremely weak with many consumers out of the market. Among the dragging items are stove plate, motor blocks and mixed cast.

Boston—Below-ceiling prices for cast held for this week. Consumers of steel scrap were getting more quality conscious on shipments. There is no market for unstripped motor blocks and not much demand for stoveplate.

Scrap Prices

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments. Shipping point and delivered prices calculated as shown below.)

GRADES	OPS No.	Basing Points															
		Pittsburgh	Johnstown	Blackridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Wheaton	Cleveland	Buffalo	Chicago	Clayton
No. 1 bundles	1	\$44.00	\$44.00	\$43.00	\$42.50	\$42.00	\$41.00	\$41.00	\$41.00	\$41.00	\$41.00	\$41.00	\$41.00	\$41.00	\$41.00	\$41.00	\$41.00
No. 1 busheling	2	44.00	44.00	43.00	42.50	42.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00
No. 1 heavy melting	3	43.00	43.00	42.00	41.50	41.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
No. 2 heavy melting	4	43.00	43.00	42.00	41.50	41.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
No. 2 bundles	5	43.00	43.00	42.00	41.50	41.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Machine shop turnings	6	34.00	34.00	33.00	32.50	32.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00
Mixed borings and turnings	7	38.00	38.00	37.00	36.50	36.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Shoveling turnings	8	38.00	38.00	37.00	36.50	36.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Cast iron borings	10	38.00	38.00	37.00	36.50	36.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
No. 1 chemical borings	26	41.00	41.00	40.00	39.50	39.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
Forge crops	11	51.50	51.50	50.50	50.00	49.50	48.50	48.50	48.50	48.50	48.50	48.50	48.50	48.50	48.50	48.50	48.50
Bar crops and plate	12	49.00	49.00	48.00	47.50	47.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00
Punchings and plate	14	46.50	46.50	45.50	45.00	44.50	43.50	43.50	43.50	43.50	43.50	43.50	43.50	43.50	43.50	43.50	43.50
Electric furnace bundles	15	46.00	46.00	45.00	44.50	44.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00
Cut struct., plate, 3 ft and less	16	47.00	47.00	46.00	45.50	45.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00
Cut struct., plate, 2 ft and less	17	49.00	49.00	48.00	47.50	47.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00
Cut struct., 1 ft and less	18	50.00	50.00	49.00	48.50	48.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Foundry steel, 2 ft and less	20	44.00	44.00	43.00	42.50	42.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00
Foundry steel, 1 ft and less	21	46.00	46.00	45.00	44.50	44.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00
Heavy trimmings	24	43.00	43.00	42.00	41.50	41.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
No. 1 RR heavy melting	RR 1	46.00	46.00	45.00	44.50	44.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00
Scrap rails, random lengths	RR 14	48.00	48.00	47.00	46.50	46.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Scrap rails, 3 ft and less	RR 16	51.00	51.00	50.00	49.50	49.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00
Scrap rails, 2 ft and less	RR 17	52.00	52.00	51.00	50.50	50.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00
Scrap rails, 18 in. and less	RR 18	54.00	54.00	53.00	52.50	52.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00
Rerolling rails	RR 15	53.00	53.00	52.00	51.50	51.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Uncut tires	RR 20	48.00	48.00	47.00	46.50	46.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Cut tires	RR 21	51.00	51.00	50.00	49.50	49.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00
Cut bolsters and side frames	RR 23	49.00	49.00	48.00	47.50	47.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00
RR specialties	RR 24, 28, 29	51.00	51.00	50.00	49.50	49.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00
Solid steel axles	RR 25	55.00	55.00	54.00	53.50	53.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00
No. 3 steel wheels	RR 27	51.00	51.00	50.00	49.50	49.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00
Unassorted	RR 35	40.00	40.00	39.00	38.50	38.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00

Cast Scrap Ceilings

Prices set by CPR 5, OPS

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	\$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runout or prepared cupola drops is 75 pct of corresponding grade.

Cast Prices

(Below-Ceiling Prices at Some Districts)

BIRMINGHAM

(Delivered prices)

Cupola cast	\$41 to \$42
Stove plate	39 to 40
Charging box cast	41 to 43
Heavy breakable	41 to 43
Dropped broken machinery	41 to 42
Uncleaned motor blocks	41 to 42

BOSTON

(Brokers' buying prices)

Cupola cast	\$46 to \$47
Stove plate	42 to 43
Unstripped motor blocks	38

NEW YORK

(Brokers' buying prices)

No. 1 machinery cast	\$50 to \$52
Mixed yard cast	47 to 49
Charging box cast	45 to 47
Heavy breakable	43 to 45
Unstripped motor blocks	40

ST. LOUIS

(Delivered prices)

Heavy breakable	\$45
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PHILADELPHIA

(Delivered)

Unstripped motor blocks	\$43
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DETROIT

(Brokers' buying prices)

Unstripped motor blocks	\$40
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SAN FRANCISCO

(Delivered)

Cupola cast	\$44
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LOS ANGELES

(Delivered)

Cupola cast	\$47
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SEATTLE

(Delivered)

Cupola cast	\$43
Heavy breakable	43

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh: Bessemer, Homestead, Duquesne, Munhall, Cincinnati: Newport, St. Louis: Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco: South San Francisco, Niles, Oakland, Claymont: Chester, Chicago: Gary.

SHIPPING POINT PRICES (Except RR scrap)

—for shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is \$1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, \$1.50, and New England ports, \$1.75. Maximum shipping point price on No. 1 bundles (prime grade) in New York City is \$36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap)—Ceiling on-line prices of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 187-C and amend. 4, CPR 5.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	\$8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	5.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate; 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	\$35.00
No. 1 bundles	35.00
No. 2 bundles	33.00
Mechanical bundles	31.00
Mixed, steel scrap	31.00
Rails, remelting	30.00
Rails, rerolling	30.00
Bushelings	30.00
Bushelings, prepared new factory	33.00
Bushelings, unprepared new factory	28.00
Short steel turnings	32.00
Mixed borings, turnings	32.00
Cast scrap	25.00

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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Detroit Market — Demand for used equipment continues high in Detroit but there has been little change in sales volume during the past 30 to 60 days. First class tool room equipment is, for all practical purposes, a collector's item and the trade now feels that almost any sound machine that will do the job adequately is in high demand. Mills and shapers are on top of the demand list.

Although some of Detroit's used machinery industry report moderate advances in sales, the scarcity of equipment in good condition, shortages of repair parts and long delivery dates, slow shipments of electrical equipment, and OPS price restrictions have combined to pare down business potential. The status quo is holding.

Not Enough—There has been a lusty hullabaloo about unemployment in Detroit. Industry and labor are in harmony, attacking unwise defense planning by Washington that has cut back civilian industry to an unjust degree while the vacuum created has not been filled by defense contracts.

Despite visits of a government task force and encouraging decisions for the spread of defense contracts to distressed areas, even at higher costs, the number of new war contracts being placed in Detroit is not large.

Duplicate Demand — Detroit dealers say this situation has caused true demand for used tools to pull in its head. Too many plant owners are playing a waiting game and looking for Washington action. While this happens actual placing of a defense contract results in an artificial pyramiding of demand that the trade must discount.

For instance, requests for bids on small arms contracts may result in bidding for the same equipment by as many as ten prospective buyers. Each of the buyers is after the same contract but only one—and perhaps none from this

area—will win it. It's a scrambling stage.

Experience has taught Detroit used machinery dealers to take this duplication of demand with a grain of salt. They are not being misled by this type of temporarily spurting demand.

Cash Availability—A factor influencing the overall used machinery market today is the approaching Mar. 15 income tax application deadline. Since Uncle Sam will be getting more of the small plants' profits and thereby cutting down the amount of available cash that might otherwise be reinvested into the business, some dealers believe that another restriction is added to the market.

An important "however" is entering the tax restriction picture. Efforts of Small Defense Plants Administration and some politically wise Congressmen are resulting in greater loan opportunities for small business. This may tend to offset high taxes somewhat but not to an appreciable degree, it is expected.

Private Maintenance—Electric Motor & Service Assn., Central District Chapter, NISA, recently met at the Electric Club, Chicago, to discuss inroads of plant maintenance service into motor and repair shops' business. Speaking was F. J. Geiger, manager of sales and manufacturing of Allis-Chalmers Co.

The Chapter reports that a problem is arising because a number of small plants are setting up their own maintenance service. In some cases this "service" consists of only one handy man. The Chapter is not guessing on this trend. It has studied City Hall records and discovered that many plants have added maintenance in recent years. Conclusion is that business is being lost and more business will be lost if the pattern develops.

The 1952 NISA convention will be held at the Stevens Hotel, Chicago, on Apr. 20-23.